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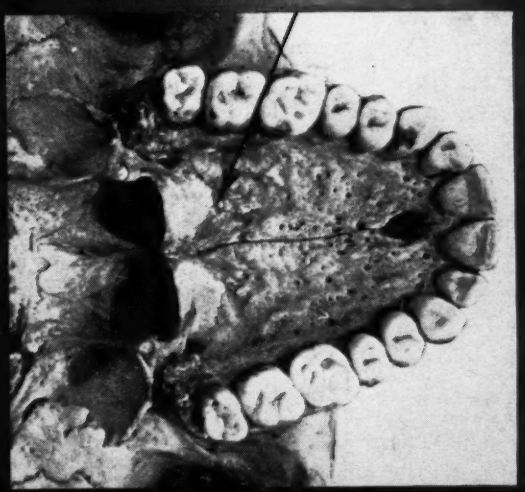

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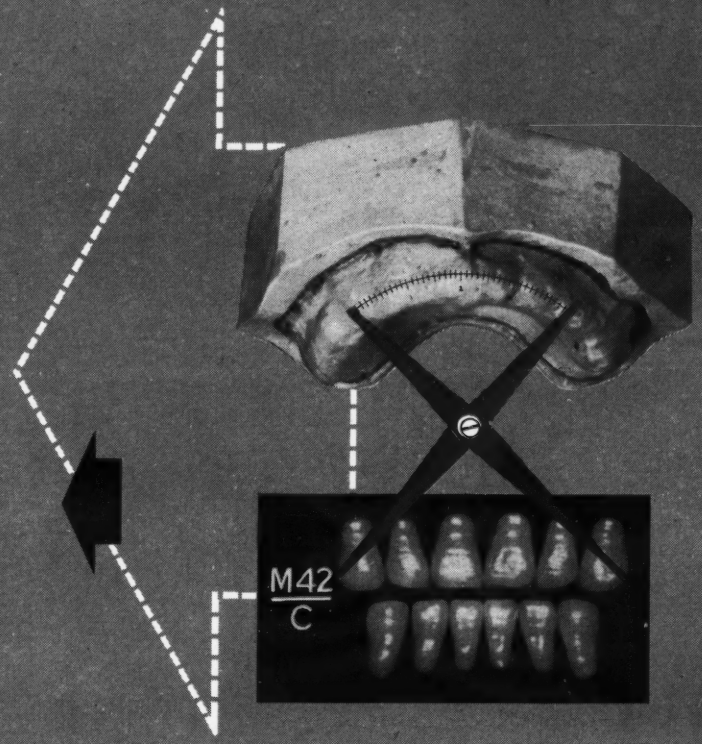

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About Our CONTRIBUTORS

BENJAMIN PATUR, D.D.S. (University of Tennessee, College of Dentistry, 1932) is a general practitioner who publishes in DENTAL DIGEST for the first time this month. In the belief that increased knowledge will be an aid to dental progress and efficiency, in DENTAL CARIES: A RATIONALIZATION OF THE GOTTLIEB CONCEPT WITH THE GENERALLY ACCEPTED CONCEPT Doctor Patur weighs the various opinions currently held on this controversial subject.

NORMAN A. GREENE, D.D.S. (Ohio State University, College of Dentistry, 1944) and LOUIS L. GREENE, B.S. (Columbia University, 1939), D.D.S. (Ohio State University, College of Dentistry, 1932) are brothers with a joint practice who have collaborated on an article, THE USE OF RAPID SETTING ACRYLIC RESINS AS A CASTING MEDIUM IN THE DIRECT TECHNIQUE which appears in the present issue. Doctor Norman A. Greene was associated for three years with the New York City Cancer Institute, Department of Hospitals. Doctor Louis L. Greene is a member of the oral surgery staff, Harlem Hospital, New York City.

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LEONARD FRANK, a roentgenologist of note, is a regular contributor to DENTAL DIGEST. His article this month, BITEWING TECHNIQUE, analyzes in particular the relationship between the vertical ray and the film.

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DENTAL CARIES:

A Rationalization of the Gottlieb Concept with the Generally Accepted Concept

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DIGEST

The present controversy over the causes and prevention of dental caries has stimulated the author of this article to make an analysis of the Gottlieb concept of the subject in comparison with the opinions more generally held. In addition, an appraisal of the criticism of Gottlieb's studies by various members of the Michigan Workshop Group is presented.

The Generally Accepted Definition of Dental Caries[1]

A disease of the calcified tissues of the teeth, caused by acid resulting from the action of microorganisms on carbohydrates, dental caries is (1) characterized by a decalcification of the inorganic portion, and (2) accompanied or followed by a disintegration of the organic substance of the tooth. The lesions of the disease predominantly occur in particular regions of the tooth, and their type is determined by the morphologic nature of the tissue in which they appear.

Gottlieb's[2] *Definition*—"Caries is a proteolytic process spreading along and affecting the organic parts. It has not the slightest similarity to the results of acid action. Organisms which produce yellow pigmentation and eventual necrosis are always present. They are usually accompanied by acidogenic microorganisms. In rare cases, the yellow pigmentation component may be present without the acidogenic component. However, if the acid component is present without the yellow pigment, caries does not develop, and chalky enamel occurs. Both components have this in common, that they invade the tooth structure through the media of the organic matter of the lamellae of the uncalcified enamel fibers or prism sheaths. This invasion and later necrosis of the organic roads is the carious process, and bacteria producing yellow pigmentation are always present." Gottlieb prefers the term, "enamel fibers" to "prism sheaths."

Division of the Process—Noyes[3] divides the process of dental caries into three stages. In the second stage (from the time when acid action reaches the dentino-enamel junction until the enamel rods fall out) he says that the acid which acts on the dentine is formed by the microorganisms on the surface of the enamel and filters through the spaces between the enamel rods. These spaces are created by previous dissolution of the calcium in the interprismatic substance.

Differences Between the Two Theories—It can be deduced from the foregoing that there are two outstanding differences between the two theories:

1. Dental caries *begins on the surface* or it begins by *invasion of the organic roads* (lamellae, enamel fibers, or prism sheaths).

2. Dental caries is (1) *primarily an acid action*, (2) probably produced by lactobacilli, with (3) a secondary proteolytic action which is present almost entirely in the dentine, or (4) it is a *proteolytic action* usually accompanied by an acid component, the proteolysis being the carious process.

Classifications of Pathologic Destruction—Because of the divergent opinions as to what constitutes the carious process it is important at this point to divide pathologic destruction of the exposed part of teeth into two classifications:

(A) Acidogenic (B) Proteolytic

Enamel Classification

To understand the Gottlieb point of view it is necessary to understand his method of enamel classification. It is as follows:

1. Normal enamel. Slightly opaque.
2. Chalky enamel.

Chalky Enamel

Cause—Due to acid action on the surface, resulting in partial decalcification. It may also be seen in areas of poor calcification caused by faulty formation.

Appearance—Chalky and opaque. The transverse striations are more visible than in normal enamel but less than in cloudy enamel. It is found in (1) areas of poor natural calcification, (2) buccal surfaces of molars, (3) lines running parallel to gingival margins (due to the action of acidogenic microorganisms in the gingival crevices during retarded periods of eruption), and (4) areas near cloudy enamel (within the enamel) where concentration of acidogenic organisms has caused decalcification ahead of their invasion through the enamel.

[1]Easlick, K. A.: Dental Caries, St. Louis, The C. V. Mosby Company, 1948, p. 201.
[2]Gottlieb, B.: Dental Caries, Philadelphia, Lea & Febiger, 1947, p. 68.
[3]Noyes, F. B.; Schour, I.; and Noyes, H. J.: Oral Histology and Embryology, Philadelphia, Lea & Febiger, 1948, p. 338.

Cloudy Enamel

Cause—Invasion of prism sheaths by microorganisms.

Appearance—White to brownish, depending upon the concentration of yellow pigment present. Transverse striations become more apparent in ground sections.

It must be borne in mind that Gottlieb does not consider caries to be present unless there is some trace of yellow pigment. He believes (1) that the cloudy appearance is due to the presence of acidogenic microorganisms, and (2) the yellow pigment to the presence of proteolytic microorganisms which are almost always present in varying degrees.

Transparent Enamel (Hypercalcified Enamel)

Cause—Slow acid reaction. This has been done artificially with mild acid.[4] In vivo, it is often seen under chalky and cloudy enamel and it is caused by a shift resulting in a redeposition of calcium salts.

Appearance — Transparent, because of hypercalcification.

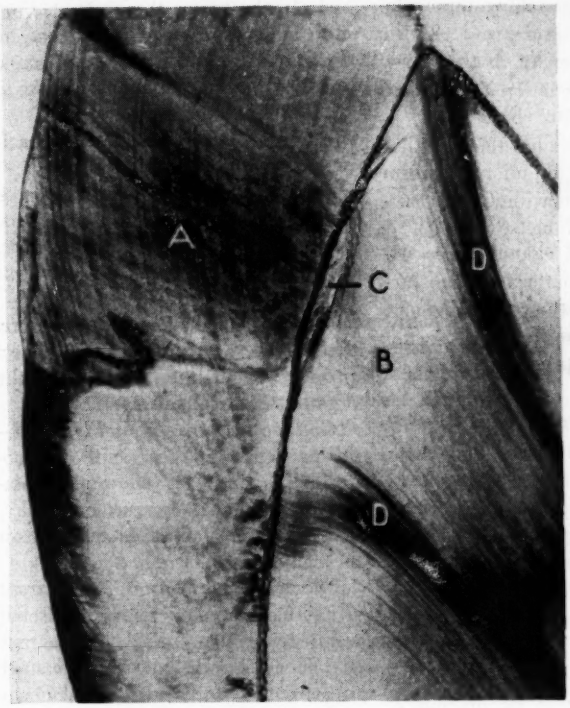
Substantiation of Opinion

Gottlieb has shown many photomicrographs with the different types of enamel listed. Their existence, therefore, cannot be denied. The explanation, as in the generally accepted concept of dental caries, is theoretical but more detailed and ingeniously thought out.

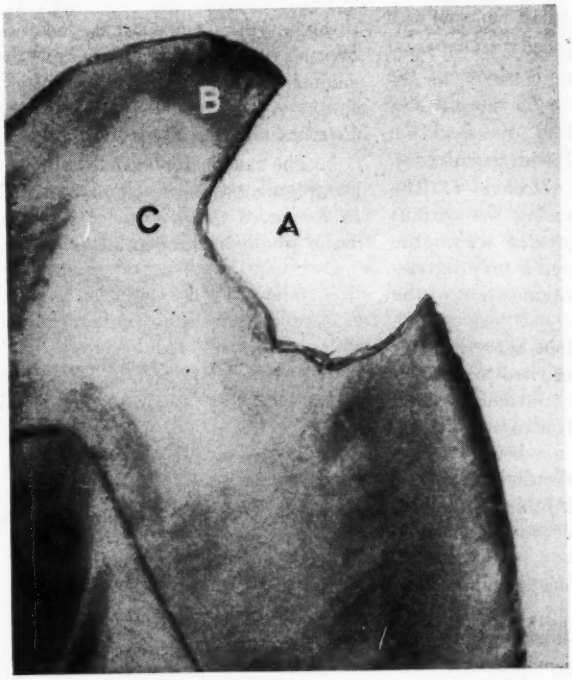
Chalky Enamel Not Considered Dental Caries—Gottlieb considers chalky enamel to be a separate entity, but not dental caries. Unless these areas are subsequently invaded by microorganisms through the organic matter, there is seldom penetration to the dentino-enamel junction. The exceptions would be thin enamel areas. The invasion with traces of yellow pigmentation, resulting in cloudy enamel, constitutes a carious lesion.

Increased Visibility in Cloudy Enamel—Gottlieb's photos of slides definitely show that caries of the typical smooth surface type (the base at the surface and tapering toward the dentine) is spearheaded by acidogenic microorganisms. It is his belief that the presence of microorganisms as well as decalcification contributes to the increased visibility of the transverse striations. This logic has merit as this greater visibility is more pronounced than in chalky enamel. Gottlieb has also shown that in invasion of lamellae, yellow pigmentation forms the spearhead.

Yellow Pigmentation and Necrosis—1. It is important to call attention to the many illustrations showing (1) an intact enamel surface with cloudy



1. *Ground section. (A) Cloudy enamel with intact surface. (B) Decalcified, shrunken dentin. (C) Aspirated, coagulated tissue fluid in the space between enamel and dentin. (D) Opaqueness surrounding the decalcified dentin. (Courtesy B. Gottlieb and Lea & Febiger.)*



2. *Tooth covered with sticky wax, leaving a window open for action of lactic acid for nineteen days. A part of the enamel, (A) was dissolved. The acid cut through the normal enamel (B) and as quickly through the transparent enamel. (C). (Courtesy B. Gottlieb and Lea & Febiger.)*

[4]Gottlieb, B.: Dental Caries, Philadelphia, Lea & Febiger, 1947, p. 76.

enamel containing yellow pigmentation in varying degrees, and (2) the increased presence of both yellow pigment and acid action at the dentino-enamel junction (Fig. 1).

2. Gottlieb points out that if either of these products of microorganism activity came from without, the surface could not be intact.

3. Because acid cannot cause necrosis of organic matter, Gottlieb further concludes that the yellow pigment is a product of, and necrosis is the cause of proteolytic microorganisms.

Additional Proof of Theory

Gottlieb calls attention to the arresting effect of transparent enamel on the carious process. His illustrations reveal abrupt arrest of caries where transparent enamel is encountered. If caries were purely an acid action, transparent enamel would not be an obstacle.

Test With Slow Acting Acid—This was definitely proved by placing a ground section in mild acid (Fig. 2), covering all but a small window with wax. The acid produced a transparent zone of enamel as is done in the mouth in slow acting acid. Further exposure to the acid dissolved the transparent enamel with equal ease.

The Conclusion Drawn—1. The microorganisms causing the carious process must be present within the lesion and are stopped from progressing by the greater calcification of the enamel fibers.

2. It is known[5] that enamel caries resists acid action in vitro to a much longer degree than normal enamel. If caries is an acid action from the surface, this could not be.

3. It is part of Gottlieb's concept that the presence of both proteolytic and acidogenic microorganisms in the organic roadways contribute to this greater resistence because they are protein bodies.

4. Ground carious sections of enamel treated with acid reveal necrotized enamel fibers and dislocated and collapsed enamel rods, the latter caused by the necrosis.

The Difference Between Acid Action and Caries—Gottlieb points out that caries action is governed by the quality of the tooth substance:[6]

1. In the crown the greatest diameter of the carious cavity is at the dentino-enamel junction (the enamel rods fall out after the yellow pigment reaches this area.)

2. The greatest diameter of acid destruction is at the surface.

3. In the root surface the greatest diameter of the carious cavity is at the surface while acid action causes shrinkage but leaves the dentine histologically intact.

4. The conclusion is, therefore, that caries destruction is in direct proportion to the quality of the organic matter present.

Gottlieb's Micrograph, Figure 3—Of particular interest is the micrograph showing (1) yellow pigmentation, (2) cloudy, opaque, or chalky, and (3) transparent enamel all on the same tooth.

Enamel Classification is Accurate—The cloudy enamel spearheads the yellow pigment, the transparent enamel stops both, but chalky enamel (apparently produced by a concentration of acidogenic organisms and released previously) progresses through the transparent enamel, bearing out the accuracy of the enamel classification.

Caries of the Dentine

1. The reason for varied light yellow pigmentation in cloudy enamel as compared to the heavier pigmentation found in the dentine is due to the presence of only 5 per cent or less of organic matter in the enamel as compared to 66 per cent in the dentine.

2. It is Gottlieb's belief that in cases of intact enamel, shrinkage of the dentine by acid action at the dentino-enamel junction causes aspiration of tissue fluid from the pulp thus furnishing additional food for the microorganisms (Fig. 7).

Appraisal of Gottlieb's Deductions

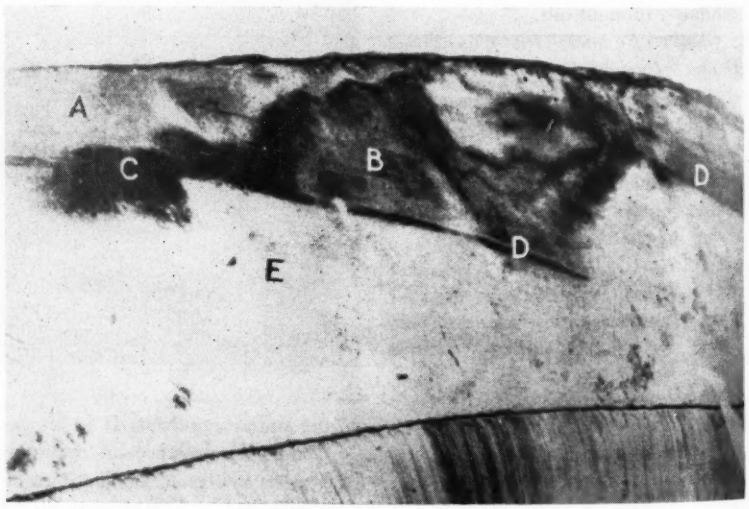
1. In discussing Gottlieb's theories at the Michigan Workshop, Kerr[7] states that nature is not too accommodating to put lamellae at contact points or the point where caries is usually seen, and that the lamellar theory of caries as the only source of initial caries is, therefore, opposed by this statement.

2. In contradiction to Kerr's implication is the fact that Gottlieb does not confine the initial carious lesion to a lamella but also to enamel sheaths or fibers. Gottlieb states[8] that he does not know which road of invasion predominates, the lamella or the enamel fibers.

3. Proximal caries usually begins gingivally from the contact point. In these thinner areas of enamel lamellae are numerous.

[5]Gottlieb, B.: Dental Caries, Philadelphia, Lea & Febiger, 1947, p. 69.
[6]Lecture Series, October, 1949.

[7]Easlick, K. A.: Dental Caries, St. Louis, The C. V. Mosby Company, 1948, p. 44.
[8]Answer to question by author.



3. ***Discolored, intact contact surface of enamel. (A) Yellow; (B) cloudy; (C) opaque enamel. (D) Incremental lines. (E) Transparent enamel. (Courtesy B. Gottlieb and Lea & Febiger.)***

Gelatinous Plaques—1. Stephen[9] cites G. V. Black's study on gelatinous plaques to disprove the theory that tenacious plaques start in lamellae.

2. There are many types of plaques; the gelatinous is not, therefore, necessarily related to the tenacious plaque. Gottlieb's theory is that invasion of the lamella comes before plaque formation, so that this difference of opinion is irrelevant.

3. Caries through a lamella and without the presence of a plaque of any kind, as often seen on a cusp, seems to bear this out.

Theory of Lamellar Caries Challenged—1. Robinson states that if sections are cut through the edges of the conelike areas of caries, the same picture can be reproduced as an artifact. The artifact could be reproduced but if treated with acid it would disappear. Because it was composed of organic matter which is resistant to acid, the true lamella has remained intact many times when treated in this manner by Gottlieb.

2. Robinson admits in further discussion[10] that lamellar caries may occasionally occur. During discussion on this subject he states that Gottlieb claimed he could not produce artificial caries because the artificial lesions did not have yellow stain.

3. Robinson states that he repeated Gottlieb's experiment and blew tobacco smoke through the solution, staining the artificial caries yellow.

4. The only conclusion to be drawn from this is that tobacco smoke will stain yellow whatever it might come in contact with.

Yellow or Brown Pigmentation a Product of Carious Activity—Among several authorities who give credence to the theory that yellow or brown pigmentation is a product of carious activity, Gottlieb cites Bibby.[11] Also, as stated previously, the yellow pigment is shown to be a product from within the carious process by the many photomicrographs evidencing the spread of this color at the dentinoenamel junction in cases of intact enamel.

Gottlieb relates[12] and illustrates his production of artificial caries with yellow pigmentation by placing teeth in solutions of saliva and incubating them.

Impregnation Treatment—Zander[13] seems to interpret Gottlieb's idea of blocking the invasion roads to be concerned only with lamellae. This interpretation is erroneous; Gottlieb meant both the lamellae and enamel fibers and mentions them many times. He also stated orally[8] that he did not know which road of invasion predominates.

Two Principles in Effects—According to Zander, Gottlieb claims his impregnation treatment to be the same as that of silver nitrate. This is true as far as it goes but Gottlieb divides the effects of his treatment into two principles:

1. The silver nitrate principle: Coagulation of the organic matter forming a permanent compound with the latter.

2. The sodium fluoride principle: Sodium fluoride as used by Lukomsky attracts calcium in the organic roads, forming calcium fluoride and thus blocking the roads.

The Sodium Fluoride Principle—The zinc chloride acts on the silver nitrate principle. The follow-up with potassium ferrocyanide combines to form and bind with coagulated organic matter and zinc chloride to form an insoluble white salt of zinc ferrocyanide, blocking the invasion road. This, according to Gottlieb, is the sodium fluoride principle.

Summary and Conclusion

1. It is important that pathologic destruction of the exposed portion of the tooth be reclassified as follows:

(1) Destruction from the surface.
   a) Chalky enamel
(2) Destruction from within.
   a) Chalky enamel without yellow pigmentation. This is limited and is due to invasion of enamel fibers by acidogenic microorganisms.
   b) Cloudy enamel with yellow pigmentation. This is less limiting in action because of invasion of prism sheaths by both acidogenic and proteolytic microorganisms.
   c) Yellow pigmentation without acid signs. Along prism sheaths and lamellae. Caused by invasion of enamel fibers and lamellae by proteolytic microorganisms.

2. The above classification makes it apparent that the word caries is no longer an all-inclusive term. Gottlieb's theory that the presence of yellow pigmentation followed by necrosis is the carious process definitely clarifies the destructive processes of the tooth. Acid destruction is definitely recognized and classified, but relegated to its proper place. Gottlieb's research shows that the greater destruction is accomplished only in the presence of the proteolytic process and that this process ends in decay or necrosis. His terminology, therefore, seems valid.

3. In its evaluation of dental caries[14] the Michigan Workshop group does admit that defects in the enamel, such as lamellae, pits and fissures, and artificially produced defects may (1) afford pathways for the entrance of microorganisms and (2) result in caries proceeding from the surface of the defect. Although this opinion is accepted as an infrequent occurrence, it does imply that caries may take place in the form of invasion. A more thorough study of the Gottlieb research and concept would aid in dispelling a multitude of misconceptions.

4. It seems logical that if destruction of tooth substance progresses through the invasion of the organic pathways, a means to block these avenues is necessary.

20 *Burnside Avenue.*

[9]Easlick, K. A.: Dental Caries, St. Louis, The C. V. Mosby Company, 1948, p. 56.
[10]Easlick, K. A.: Dental Caries, St. Louis, The C. V. Mosby Company, 1948, p. 63.
[11]Bibby, B. G.: The Organic Structure of Dental Enamel as a Passive Defence Against Caries, J. Dent. Research **12**:99 (February) 1932.
[12]Gottlieb, B.: Dental Caries, Philadelphia, Lea & Febiger, 1947, p. 186-7.
[13]Easlick, K. A.: Dental Caries, St. Louis, The C. V. Mosby Company, 1948, p. 144.
[14]Easlick, K. A.: Dental Caries, St. Louis, The C. V. Mosby Company, 1948, p. 203.

The Use of Rapid Setting ACRYLIC RESINS *as a Casting Medium in the Direct Technique*

NORMAN A. GREENE, D.D.S.

and LOUIS L. GREENE, B.S., D.D.S., New York

DIGEST

The recent development of the rapid setting acrylic resins provides a medium not available to the practitioner in the past. Formerly, the direct technique for crowns was only used successfully by a limited number of skilled operators. The present ease of manipulation, however, makes its general use possible.

The technique described in this article has been successfully used by the authors in making the following: (1) full cast crowns, (2) three-quarter crowns, (3) veneer crowns for acrylic retention, (4) pin ledge crowns, (5) post crowns, (6) thimble copings, and (7) inlays.

Physical Properties of the Material

1. The rapid setting resin exhibits no adhesive properties when polymerized. It depends on undercuts for retention when used as a direct restoration material. Thus, it can be removed from crown and inlay preparations possessing no undercuts.

2. A valuable property of the resin is its ability to vaporize at 400° Fahrenheit without leaving any residue. This permits it to be used successfully as a casting medium.

Advantages in the Use of Rapid Setting Acrylic Resins

1. The striking advantage of this material over wax is its greater tensile strength which makes it possible to manipulate directly patterns of extreme delicacy formerly reserved for the indirect techniques.

2. Accuracy is improved because it is a direct method and there are a minimum number of transfer operations.

3. Finishing time is minimized because occlusion and contact points are accurately established in the mouth.

4. The proper distribution of bulk can be acquired, margins may be thinned down and finished below the gingivae without the fear of breakage that is experienced in handling inlay wax.

5. Because this material can be cut, finished, and polished thoroughly, the final crown requires virtually no finishing when it is seated.

Several Brands of Fast Setting Acrylic Resins Available

1. The authors have used one of the most rapid setting types of fast setting acrylic resins (Caulks-Kadon) with which the hardened pattern can be removed and manipulated in five minutes.

2. A purple dye was added to the monomer liquid (castolite-violet) to increase visibility of the pattern in the mouth. One drop of dye per cubic centimeter of liquid provides an intense purple to the acrylic resin. A bottle of monomer prepared in this manner is stored for use when needed.

3. Yellow articulating paper was used to contrast the purple of the pattern.

Technique for Direct Three-Quarter Crown

1. Select an aluminum shell crown 2 to 3 sizes larger than the prepared tooth.

2. Cut down and festoon the shell so that it will extend approximately 2 millimeters beyond the surface of occlusion.

3. Contour the gingival border of the shell inwardly.

4. Add resin to the shell and place over the prepared tooth.

5. Allow the material to set, following manufacturer's specifications.

6. Strip the shell from the resin by use of bur, disc, or shell crown remover.

7. Remove acrylic from unprepared labial or buccal surface to eliminate undercuts.

8. Grind in occlusion.

9. Remove pattern and contour for proper bulk and anatomy. Overhang at the gingival is removed with fine discs.

10. The pattern is replaced in the mouth and the margins are finished. A warm instrument may be used for burnishing the margins.

11. Polish the acrylic pattern with a berlow disc. Care must be exercised not to generate excess heat. Follow with pumice and fine brush.

12. Add inlay wax to proximal contacts and, whenever necessary, to the occlusal to build up cusp height.

13. A lower fusing wax, as baseplate wax, may be added to the inside of the margins and the pattern reinserted. Experience, however, has shown that this is rarely necessary as the inherent shrinkage of the material on setting seems to be overcome by the water absorption of the resin.

14. The pattern is then sprued with a drop of sticky wax and cast in the usual manner.

Modification for Full Line Crown

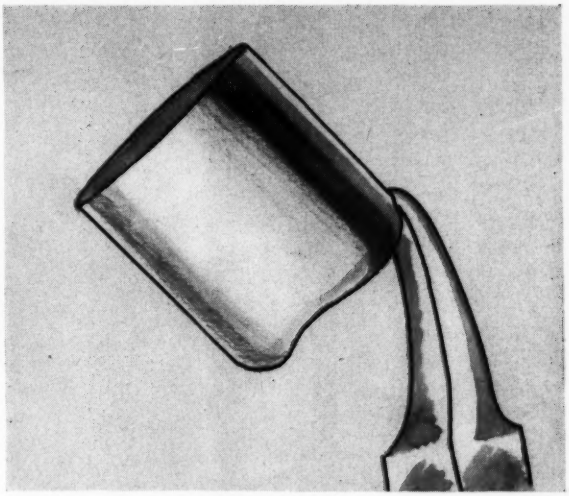
1. The procedure is the same as for the three-quarter crown. 2. The aluminum shell, however, can be peeled off outside of the mouth after the acrylic is set. 3. If necessary, remove some acrylic from the inside of the occlusal third of the pattern to reduce bulk and thermal conductivity.

Post Crown

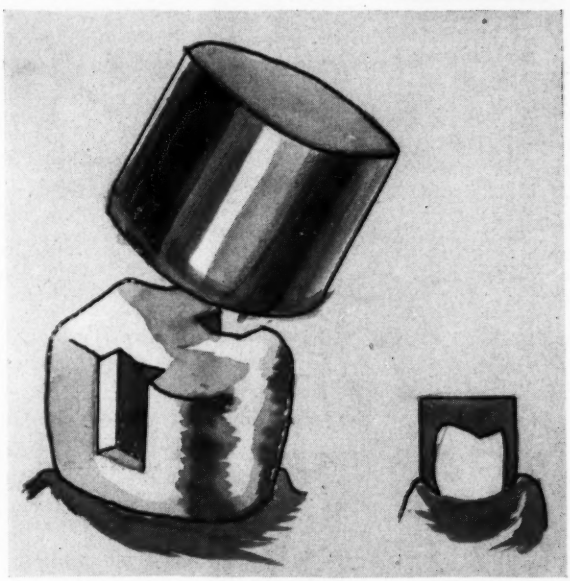
This technique lends itself most remarkably to what was formerly a time-consuming operation: 1. The tooth is prepared with a slightly tapered post hole, carefully avoiding all undercuts. 2. An aluminum shell is prepared as for a full crown. 3. The post hole is filled and overpacked with a plugger, and the shell, filled with resin, is then seated. 4. When hardened, this may be contoured for a veneer crown or a post crown. Thus, the necessity for models and dies is eliminated.

Gold Inlay Technique

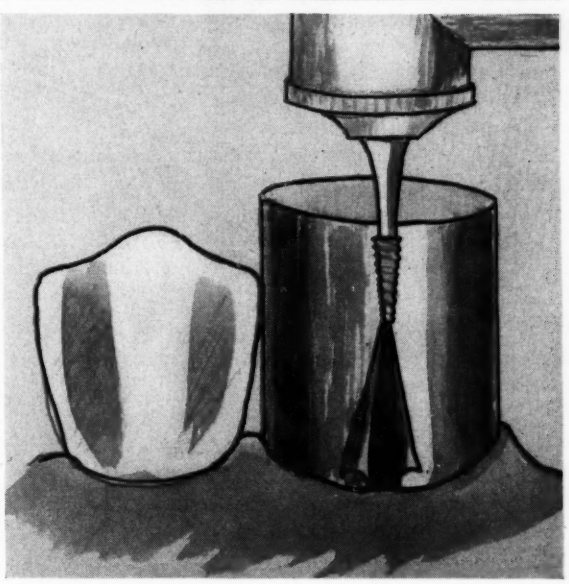
Difficulties Eliminated— Many of the customary difficulties experienced in the handling of waxes are elim-



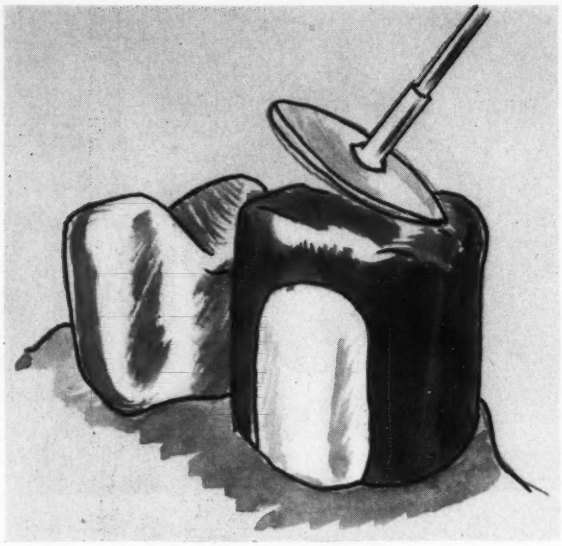
1. ***Select an aluminum shell crown 2 to 3 sizes larger than the prepared tooth. Cut down and festoon the shell so that it will extend approximately 2 millimeters beyond the surface of occlusion. Contour the gingival border of the shell inwardly.***



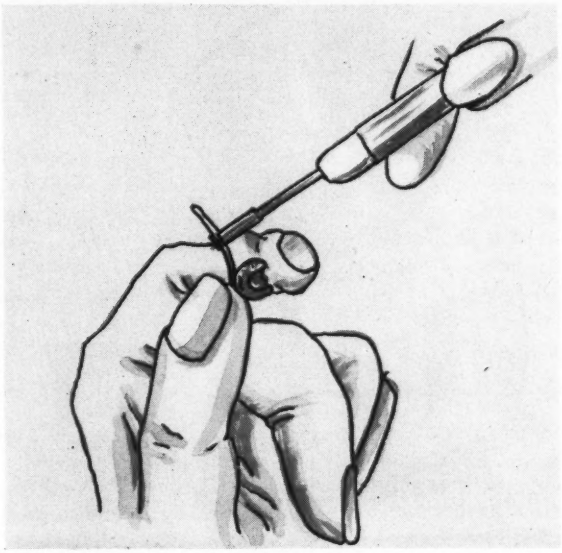
2. ***Add resin to shell and place over prepared tooth. Permit material to set according to manufacturer's specifications.***



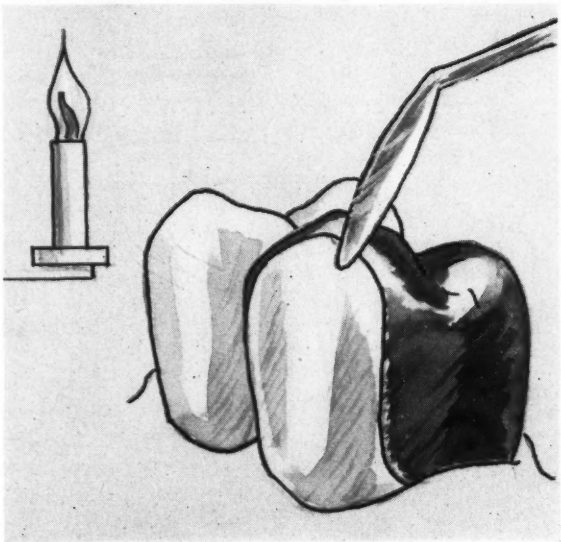
3. ***Strip shell from resin with a bur, disc, or shell crown remover.***



4. ***Remove acrylic from unprepared labial or buccal surface to eliminate undercuts. Grind in occlusion.***



5. ***Remove pattern and contour for proper bulk and anatomy. Overhang at the gingival is removed with fine discs.***



6. ***The pattern is replaced in the mouth and the margins are finished. A warm instrument may be used for burnishing margins.***

inated. The resin is easily condensed into the most difficult areas including pin preparations. It can be used in slice preparations where the walls of the pattern are thin and fragile.

Parallel Preparations Required— The presence of undercuts will not lead to a distortion as in wax, but will prevent the removal of the pattern. It is also important that zinc oxide should not be used as a base because it prevents proper setting of the resin.

Procedure— 1. Fit a continuous matrix band around the tooth. The matrix should extend just to the occlusal surface. Carefully insert a wedge to prevent the resin from overextending below the gingivae.

2. Acrylic is packed into the preparation. When pin holes are present, they are first plugged individually.

3. Place a piece of cellophane or aluminum foil over the occlusal, then cover with a quarter-inch-thickness of gum rubber and have the patient bite until the resin is hard.

4. Remove the pattern before removing excess. This excess overlays the occlusal of the matrix. Removing the matrix band aids in the removal of the pattern.

5. Remove the excess, reinsert the pattern, adjust occlusion, and finish the margins.

6. Buff the pattern with brush and pumice. Add contact in wax and finish the pattern. Invest and cast.

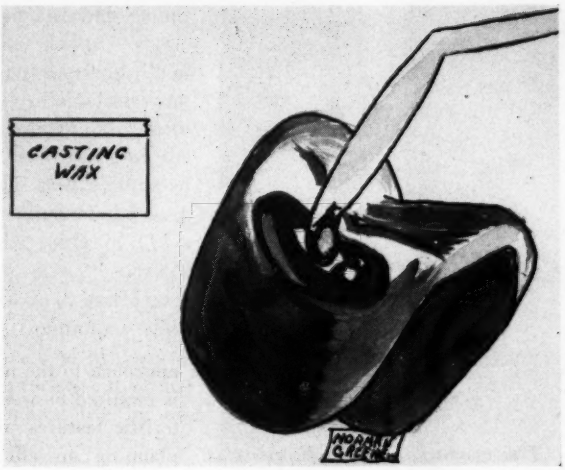
Summary

1. A direct method for full cast crowns, three-quarter crowns, veneer crowns, post crowns, and inlays is easily employed by use of fast setting acrylic resin in lieu of inlay wax.

2. Articulation and contour are directly and easily attained in the mouth with greater accuracy since there are a minimum number of transfer operations.

3. The practitioner can directly manipulate patterns of extreme delicacy which were reserved for the indirect technique, thus eliminating time-consuming laboratory work.

101 *West 55th Street.*



7. ***Polish acrylic pattern with a berlow disc. Care must be exercised not to generate excess heat. Follow with pumice and fine brush. Add inlay wax to proximal contacts, and whenever necessary, to the occlusal to build up cusp height.***

Occlusal Equilibration Of The Natural Dentition

S. CRIPPS, B.A., L.D.S., London

THE PHYSIOLOGY of normal mastication includes the process of tooth wear. Unfortunately, the modern mouth is characterized by (a) too much, or (b) too little wear. The morsal surfaces of many forty-year-old occlusions disclose no appreciable wear, while many immoderately worn occlusal and incisal surfaces result in (1) unfavorable load, (2) the loss of sluiceways, and (3) food impactions.

Selective Grinding

Both the insufficiently worn and the excessively worn occlusions can benefit by selective grinding.

The Use of Carbon Paper—1. Old carbon markings should be erased prior to the taking of a new registration.

2. Thin oiled carbon paper is used to avoid blurs and smudges.

3. Registration should be taken bilaterally.

4. Carbon marks go in pairs; each marking has a complementary one on the opposite jaw. They should be considered together.

5. Carbon paper registration confirms wax bite findings as well as the diagnostic aids, in conjunction with one another, simplify corrective measures.

Equilibration of the Contacts—Equilibration of the contacts of one relationship must not disturb the established contacts of other relationships. Carbon marks of the fossae, the peaks, and the inclined planes of the lingual cusps of maxillary posteriors, and the peaks and the inclined planes of the buccal cusps of mandibular posteriors must be shunned during the equilibration of lateral and protrusive excursions.

Flattening the Cusps—The slogan, "flatten the buccal cusps of the uppers and the lingual cusps of the lowers," should not be taken too literally. Although it is true that the buccal aspects of the maxillary buccal cusps and the lingual aspects of the mandibular lingual cusps do not enter into important occlusal relationship, the ruthless grinding of these surfaces should be avoided.

The Anatomy of the Tooth Should be Retained—Facets must not be made during grinding of tooth surfaces. The sharpness of cutting cusps and the depth of food exits must be secured.

Instruments—Only small carborundum or diamond stones are used to grind selective portions of carbon marks.

The Maxillomandibular Opening—The dominant tone in selective grinding is the retention of the maxillomandibular opening.

Monthly Inspections—Three to six monthly inspections are essential to check any possible supraocclusion of the anteriors.

Final Steps—The last step in the operation is a thorough polishing of all tooth surfaces which have been ground. Roughness in the contacting surfaces increases the coefficient of friction and can be injurious to the supporting tissues.

Conclusion

1) The diagnosis and treatment of periodontal disease should not be undertaken without seriously considering the occlusal factor. Although it may be only contributory or an effect in some cases of periodontal condition it must be reckoned with as a principal causative factor in others.

2) Occlusal equilibration must be a systematic procedure. It involves a thorough study of the normal picture and the individual formulation of a plan of treatment of the abnormal. No two cases are identical. Although dentists have been censored for undergrinding, over-grinding, or not grinding at all, it is better, when in doubt, to do too little than too much.

3) Occlusal treatment should be done in the child after orthodontic treatment has been completed. It has its place in all forms of restorative dentistry and the operator may do well to equilibrate the occlusion of the remaining teeth prior to the insertion of fixed and removable bridges as well as partial dentures.

4) Selective grinding is no panacea. It renders greater service as a preventive than as a curative agent. In this era of universal awareness of prevention, occlusal equilibration opens up a new field of endeavor in dentistry and must be accepted as an integral part of dental practice.

From *British Dental Journal* 4:95-96 (February 17) 1950.

DENTISTRY—

An Asset to the Cerebral Palsied Child

MANUEL M. ALBUM, D.D.S., Philadelphia

DIGEST

Dentistry for the cerebral palsied child is neglected in many communities. Although the situation is easy to correct, poor dental care exists among the 500,000 boys and girls who are afflicted with cerebral palsy in this country.

Much has been written concerning preventive dentistry and dental care for adults and children. Unfortunately, however, little has been recorded concerning the dental plight of cerebral palsied children and until the last two or three years slight interest has been shown by the public concerning these children. A group of men and women have been properly trained to diagnose and treat these boys and girls medically, but there are few to give them dental treatment.

The reason for this situation is that the dental profession has not been trained to cope with these children. Dentists hesitate to serve the cerebral palsied child (1) because of the movements of the patient, and (2) because of the possibility of inadvertently injuring the child.

The author of this article has treated over a thousand cerebral palsied children at the dental clinic sponsored by the Philadelphia Society for Crippled Children and Adults and believes that successful treatment is based on the fundamental factor of the approach. He believes that gaining the child's confidence and putting him at ease is of utmost importance and discusses in this article the specific measures that he has found by experience to be satisfactory.

Definition and Forms of Cerebral Palsy

Cerebral palsy is a disability involving the nerves and muscles which results from injury to certain centers of the brain that govern muscular control. Unlike infantile paralysis, there is no wasting away or atrophy of the muscles after the injury to the motor cells of the brain.

Forms of Cerebral Palsy— Of the seven classifications of cerebral palsy, spasticity and athetosis account for roughly 85 per cent of the children affected. The two are greatly mixed in varying degrees. The remaining 15 per cent is composed of the following: (1) ataxia, (2) rigidity, (3) tremors, and (4) high spinal.

Mortality Rate High—The nature of the disability is determined by the part of the brain that is damaged. Seven out of every 100,000 children born each year have cerebral palsy; of these seven, one dies before reaching the age of six.

Psychologic Aspects

The management of a cerebral palsied child is different from the approach to the normal patient. Skill is required to assess all of the characteristic features of the child and in planning an effective program for treatment and education. The children are sensitive, and terrified by the unfamiliar surroundings of the dental clinic or office.

The Effect of Parental Influence—Cerebral palsied children are of intense interest in the lives of their parents. Unfortunately, the concentration of many parents on the child is reflected in the behavior of the child. The parent unwittingly exerts a negative influence on the child's progress and prognosis and only when the parent is brought to realize this, can efficient dental treatment be carried out.

Individualized Treatment—Because cerebral palsy consists of many diversified types and classifications treatment of the patient must be altered with each type.

Characteristics of the Athetoid Patient

Many of the spastics in athetoids must be seated upon the lap of the parent who in turn controls the movements of the child and enables the dentist to work more efficiently. Athetoid patients, who are always in constant motion, present a problem because of their inability to maintain the mouth in one position for any length of time. Unless they have been under speech treatment and orthopedic treatment, their jaws snap shut like a vise. The muscles of the face have such strength that they can break a tongue depressor in two with the closure of the jaws. It can be seen how easy it is to injure the fingers and how much caution must be used

by the dentist when inserting mouth mirrors into the oral cavity.

The Effects of Overdeveloped Facial Musculature— An abnormal amount of bruxism is present in the teeth of these patients as a result of the development of the musculature of the face. Decalcification of the teeth often occurs as the result of (1) a vitamin deficiency, or (2) arrested development (Figs. 1, 2, and 3).

Bruxism Not Continuous—Fortunately, the tendency to bruxism is not a continuous process but occurs sporadically throughout life. In addition to the bruxism, cerebral palsied children present the problem of subluxation of the temporomandibular joint and the cracking sound familiar to subluxation is audible at quite a distance.

Problems in Treatment—1. Some children do not have the power of speech, so that extreme caution is necessary when drilling in order not to cause an accidental pulp exposure.

2. Some cerebral palsied children are born deaf. These are few in number but they are extremely difficult to manage and the use of analgesia or anesthesia is advised.

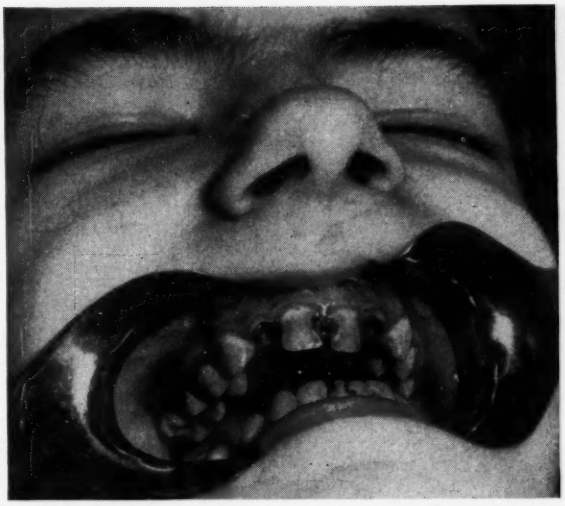
Both the Deciduous and Permanent Teeth Should be Restored

The deciduous teeth are often neglected because they only remain in the mouth for a short time, and will eventually be replaced by the permanent teeth. The deciduous teeth are of vital importance to cerebral palsied children for the following reasons: 1. They influence the permanent dentition, the dental arches, and the facial contours. 2. Early loss of the deciduous teeth has a decided effect on the speech of the cerebral palsied child (Fig. 3).

Techniques in Restoration

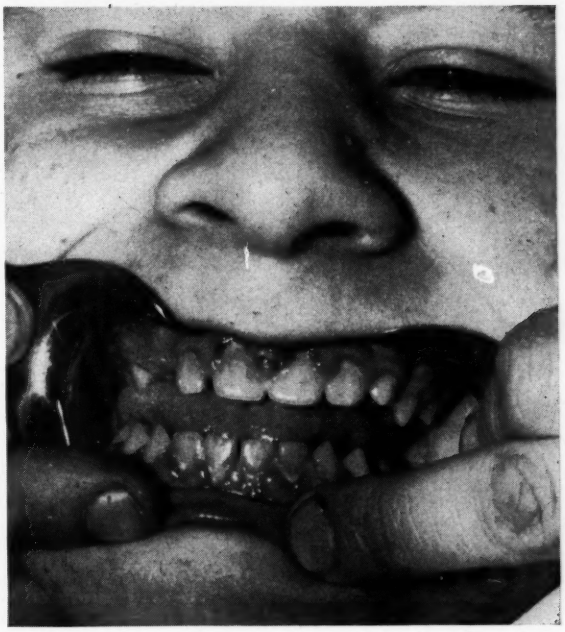
Deep pits and fissures should be treated or restored, depending on the circumstances. The actual restoration of both the deciduous and permanent teeth is with few exceptions, routine procedure:

1. Caustics, such as phenol, cannot be used to sterilize the cavity because

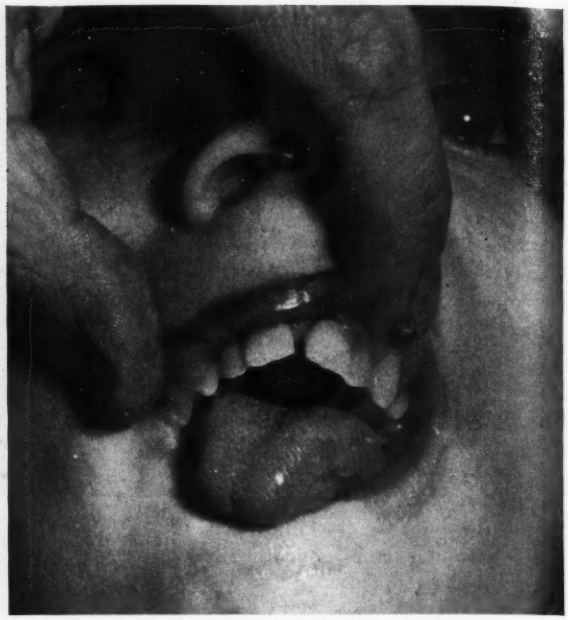


1. ***Rampant caries with poor oral hygiene.***

2. ***Hypoplasia of anterior teeth with black stain showing on lower anteriors.***



3. ***Hypertrophied gum tissue resulting from dilantin sodium treatment.***



of the movement of the patient and the possibility of burning the tissue.

2. Tincture of metaphen, untinted, is excellent for cleaning and sterilizing the cavity before the restoration is placed and can be used without injury to the patient or dentist.

3. As the first hum of the dental engine causes many of these patients to go into tremors, as soon as the child is seated in the chair the engine should be started and allowed to run while the mouth is being prepared for the cavity preparation. In this way the child becomes adjusted to the sound of the dental engine and apprehension is lessened.

4. To aid in the preparation of the cavity (1) cotton rolls, (2) tongue depressors, and (3) mouth mirrors, depending on the case, are utilized. Cotton rolls must be small as many cerebral palsied children are mouth breathers and a large object in the mouth will produce gagging (Fig. 4).

5. Patience in dealing with the child and the parent will enable the dentist to operate more freely and quickly, and achieve better results.

6. The results at the clinic show that on the whole the majority of palsied children can be given dental treatment without sedation or the use of general anesthesia.

4. ***High vaulted palate seen commonly among athetoid patients.***

5. ***Mouth breathing with prominent display of powerful tongue.***

6. ***Bruxism, in addition to poor nutrition. Notice worn appearance on molars and lower anteriors which take full force of bruxism.***

7. ***Green stain.***

Orthodontic Treatment

In many cerebral palsied children x-rays show the presence of teeth which refuse to erupt for long periods of time. In addition, when the teeth do erupt, many present problems of malocclusion. The majority of athetoid patients have high vaulted palates (Fig. 5). Early loss of the deciduous teeth is a predisposing factor for malocclusion. Mouth breathing causes contraction of the muscles of the face and mouth on the teeth and bones, resulting in an arch which is narrow and extremely long in the anterior-posterior direction. Orthodontic treatment depends (1) on the individual case, and (2) on the type of cerebral palsy existing (Figs. 6 and 7).

Treatment of Gingival Conditions

1. Some patients have foul smelling mouths from (1) lack of tooth brushing, (2) large collections of calculus, and (3) the use of dilantin sodium medication (Fig. 8).

2. In the case of dilantin treatment, the hypertrophied tissue responds well when medication is changed to mesantoin. Treatment of gingival conditions is the routine of daily practice.

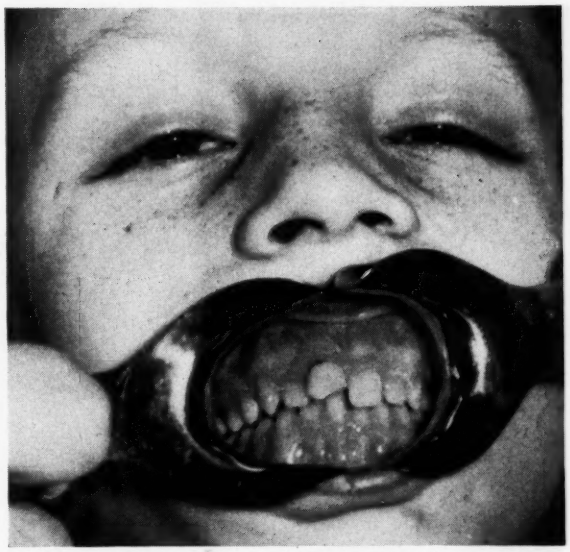
3. The first essential in treatment planning is superficial scaling. These patients cannot take (1) penicillin mouthwash, (2) penicillin troches, or (3) vitamin tablets. Massive doses of a liquid vitamin, such as zymadrops and vitikon, are, therefore, given to build up tissue resistance.

4. Light polishing with rubber cups and pumice is done during the first visit.

5. On succeeding visits, extensive scaling and more thorough cleaning is performed. The child is kept on liquid vitamins but at a reduced dosage.

Extractions and the Use of Anesthesia

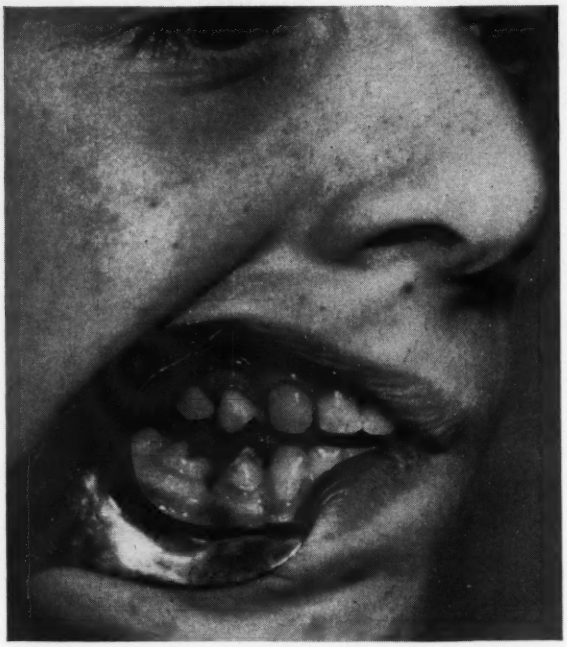
1. Before extractions are planned on cerebral palsied patients, tests for bleeding and clotting time reactions should be given. If the clotting time



8. *Green stain and fractured central incisor which will be restored later.*

9. *Malocclusion, in addition to an injury of the upper central incisors. Notice irritation around gingiva. This mouth can be corrected orthodontically.*

10. *Malocclusion.*



11. ***Premature loss of permanent teeth. Notice hypoplasia of lower first premolar.***

12 and 13. ***Premature loss of deciduous dentition, resulting in maleruption of permanent teeth. The patient shows a severe case of malocclusion.***

is abnormal it is advisable to inject 10 milligrams of synkavite preoperatively and another 10 milligrams postoperatively.

2. Atropine sulfate, 1/300 grain preoperatively will help to check the flow of saliva.

3. Oxycel, gelfoam, and sutures should be used.

4. A physical check-up should be given before the administration of an anesthetic agent.

5. Surgery is frequently performed on the children at the clinic under ether anesthesia. The after-effects of ether are slight and recovery is more rapid than with other anesthetic agents.

Anesthesia Procedure

Premedication—1. The patient is admitted the afternoon of the day preceding the operation and physical examination is made.

2. Clotting time, bleeding time, and urinalysis is done routinely.

3. Three-quarters of an hour before the operation the patient is given 1/300 grain of atropine sulfate to decrease salivation and mucous secretions in the mouth. In some cases it may be necessary to inject 1/8 grain morphine sulfate.

4. If the clotting time is abnormal, 10 milligrams of synkavite is given intramuscularly prior to the operation.

Postoperative Medication—In the majority of cases oxycel is inserted into the sockets to assist in the formation of a proper blood clot. If the clotting time is abnormally high, another 10 milligrams of synkavite is injected two hours after the operation. With this procedure hemorrhage can be controlled satisfactorily.

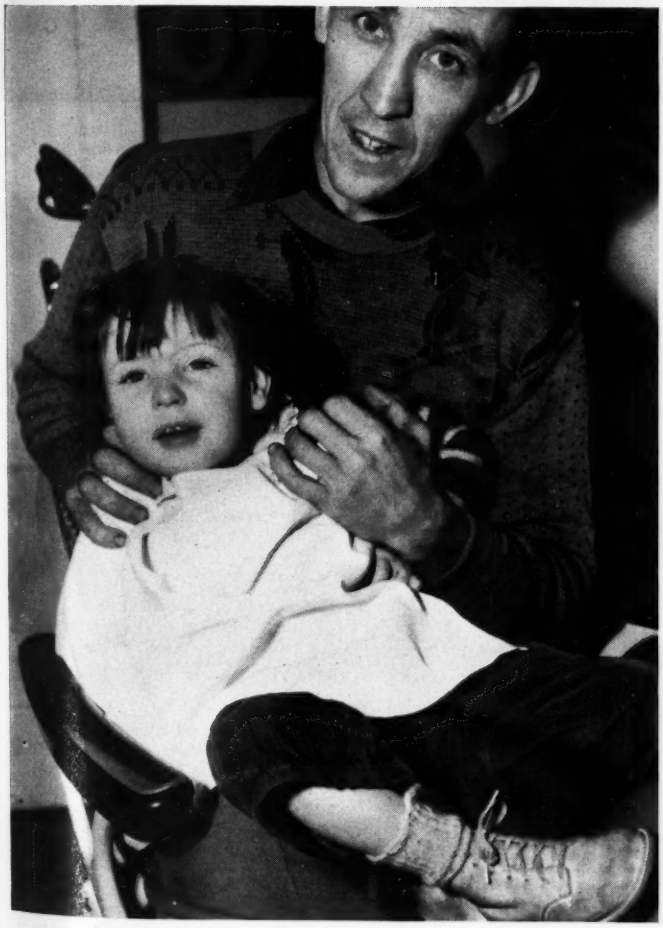
The Anesthetic Agent—1. For routine operations, such as restorations, nitrous oxide-oxygen or pentothal sodium is used, followed by nitrous oxide-oxygen.

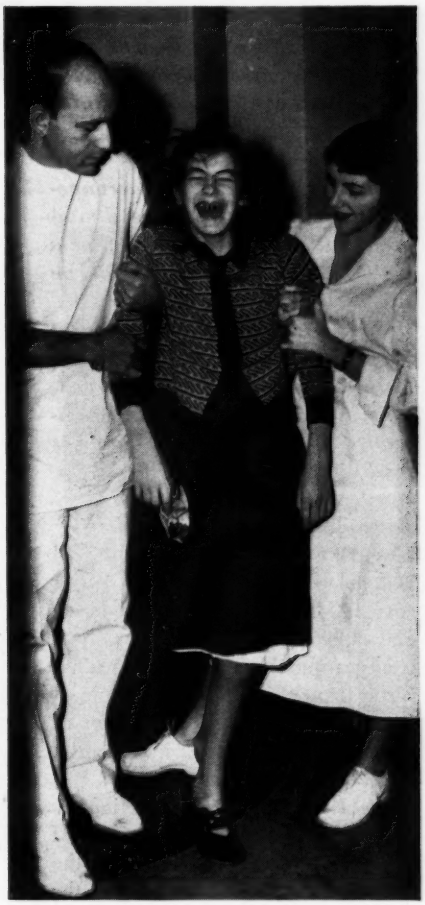
2. With nitrous oxide, the margin of anesthesia is slight and (1) passing from the light to the deep plane may be rapid (during induction), or (2) the deep plane may be slow and insidious (prolonged anesthesia.) Therefore, a safe oxygen level must be maintained at all times; otherwise

nitrous oxide becomes a mildly harmful agent and produces (1) liver damage, (2) acidosis, (3) severe constitutional disturbances, or (4) neurologic complications. The operation should be completed within thirty minutes as prolonged anesthesia is not advised for cerebral palsied children.

Local Anesthesia—Athetoid patients tolerate local anesthesia well. In the injection of local anesthesia on the palsied patient, it is important to maintain a firm grasp of the lip or cheek and the syringe to prevent slipping which would result in injury to the patient (Fig. 9).

14, 15, and 16. ***Particular types of cerebral palsied patients. Some can be treated by themselves; others must be held by a parent while having dental treatment.***





Conclusion

1. Although considered safe, an anesthetic agent may become a deadly weapon when improperly administered.

2. Patients should not be dismissed following extractions or surgery until the blood clot has formed properly in the socket.

3. If the procedures described in this article are conscientiously followed, the task of managing and serving the cerebral palsied child will be easier and more gratifying to the patient and the dentist.

1930 *Chestnut Street.*

BITEWING *Technique*

LEONARD FRANK, San Francisco

DIGEST

Most of the errors in bitewing roentgenography are caused by failure to observe the exact position of the teeth in relation to each other in the dental arch. This results in overlapping contact points which permits the concealment of many existing cavities and periodontal pockets.

In daily practice, dentists continually examine the mouths of patients. When about to take a bitewing x-ray of the teeth, however, the usual procedure is the following: 1. A film is placed in the mouth. 2. The patient is told to bite on the wing. 3. The central ray is directed at a right angle to the film and the timer pressed.

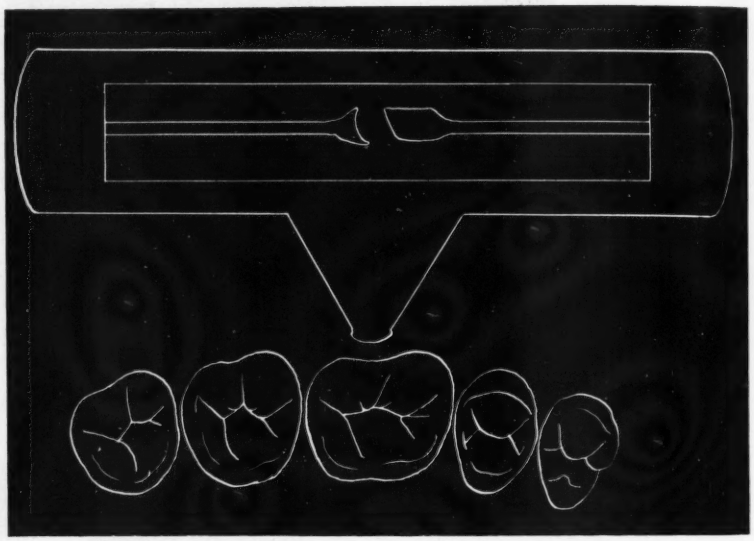
No procedure could be more wrong. A glance at the arrangement of the teeth in the dental arch will convince anyone that a right angle "shot" can not be successful.

There are basic rules governing the success of any endeavor. If these rules are not observed, success is not possible. An examination of these fundamentals is made in this article.

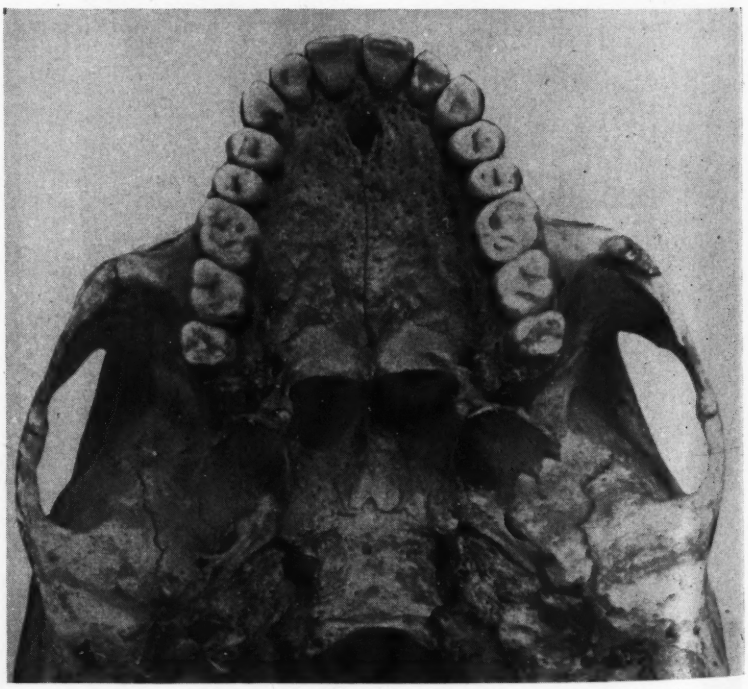
Angulation

The first fundamental to be observed is angulation. Without correct angles correct x-rays cannot be produced. The angle referred to is actually a combination of two angles: (A) The vertical angle, and (B) the horizontal angle. The proper correlation of these two angles results in the angle used.

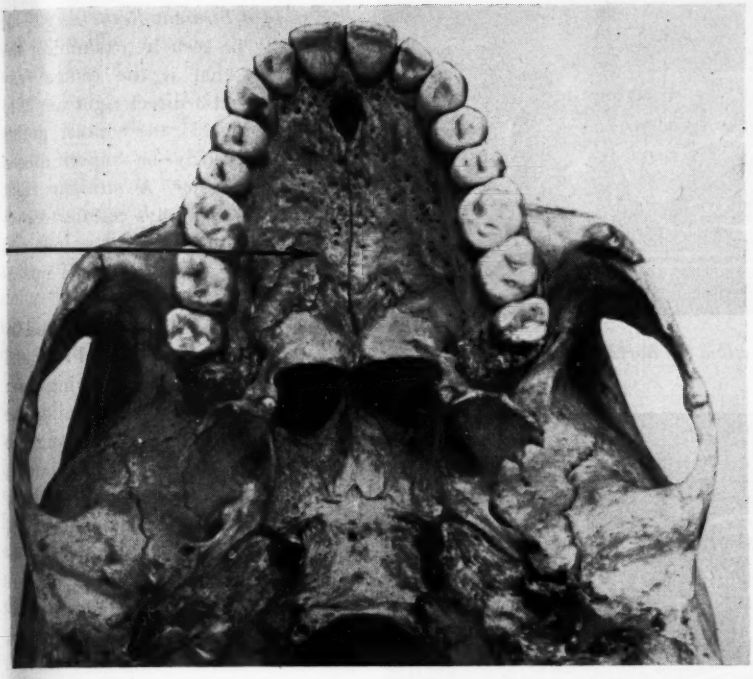
The Vertical Angle—Direction of the central ray at the long axis of the tooth; that is, up and down the tooth from the tip of the cusp to the



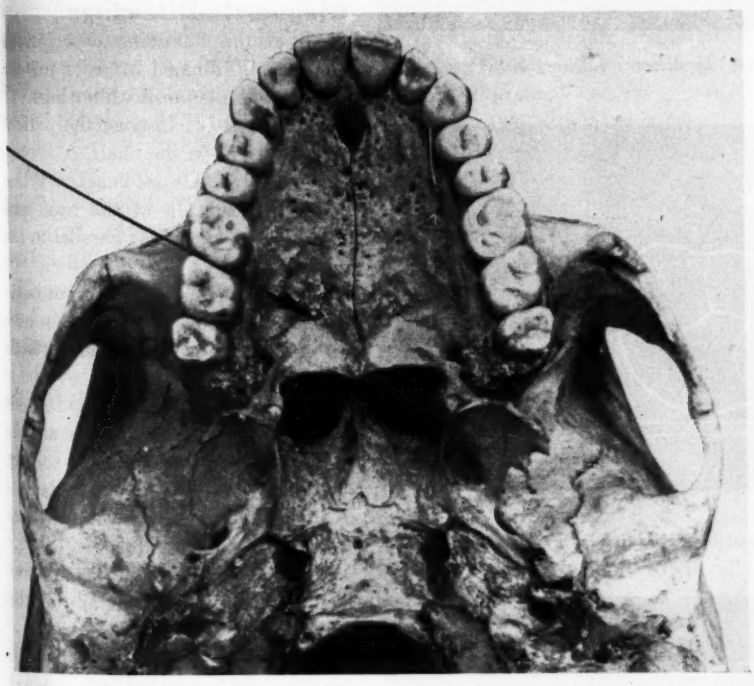
1. *Basic relationship of tube and proximal surfaces of the teeth.*



2. *An average dental arch.*



3. *Vertical right angle projection; result overlapping.*



4. *Vertical right angle projection corrected by the horizontal projection, eliminating overlapping.*

tip of the apex is the vertical angle. Incorrect direction of this angle causes elongation and foreshortening.

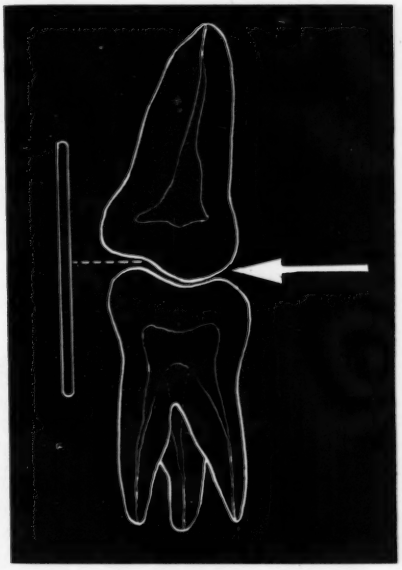
The Horizontal Angle—Direction of the ray across the short axis of the tooth; that is, from the mesial to the distal or from the distal to the mesial, is the horizontal angle. Incorrect direction of this angle causes the overlapping of contact points.

Basic Relationship

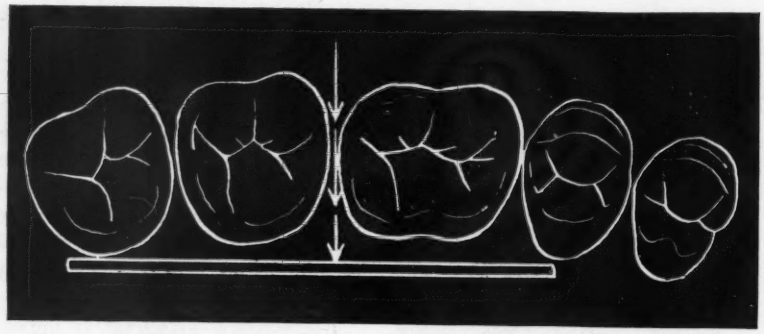
The second fundamental is the basic relationship of the tube and the proximal surfaces of the teeth. Preparatory to directing the central ray correctly, the tube should be placed parallel to the proximal surfaces of the teeth to be x-rayed.

Visualization—While it is impossible actually to see the x-ray tube, it can be visualized. Imagine a straight line drawn horizontally across the cone. (A) This is the position of the tube, and (B) it is this horizontal line that must be brought parallel to the proximal surfaces of the teeth (Fig. 1).

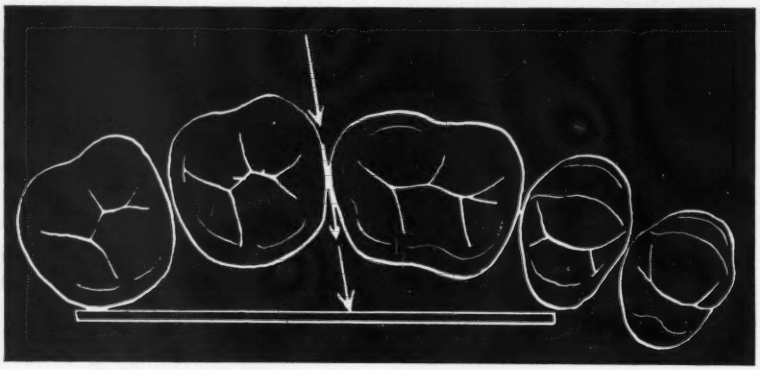
Overlapping is Frequent—Before moving the tube so that the central ray will be properly directed there is still another fundamental to be examined: Overlapping of the teeth. While overlapping of teeth can be found in any part of the dental arch, most of the overlapping is found in the upper molar regions and particularly between the first and second molars (Fig. 2). Overlapping of the first and second molars is more usual than unusual.



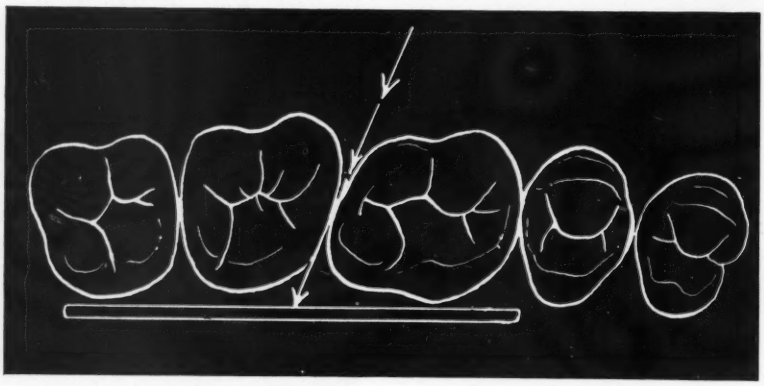
4A. *Vertical right angle projection before the horizontal correction is made.*



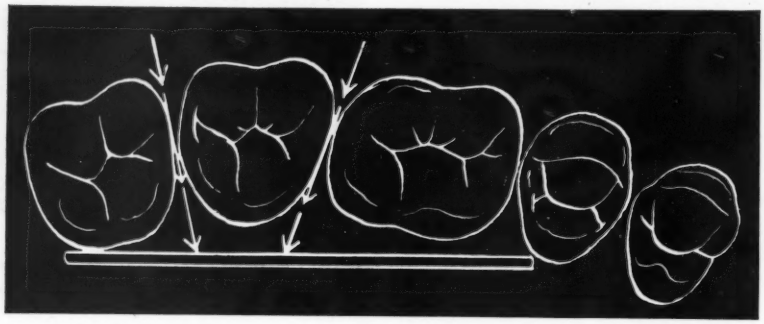
5. ***Type 1. Use vertical right angle projection. No horizontal correction.***



6. ***Type 2. Use vertical right angle corrected by distomesial horizontal projection.***



7. ***Type 3. Use vertical right angle corrected by mesiodistal horizontal projection.***



Use of a Straight Right Angle—It can easily be seen by examining the illustration that if the central ray were aimed at a direct right angle to the film (Fig. 3) the contact points would necessarily be superimposed one on the other. A straight right angle is almost always certain to produce overlapping contact points and yet this is the angle that most operators use.

Correction—This fault is caused by a violation of a fundamental rule and can be corrected in the following way: Instead of thoughtlessly placing the film in the mouth and directing the central ray at a vertical right angle, the vertical angle should have been (1) corrected by the horizontal angle, and (2) directed to follow the buccolingual occlusal contact line (Fig. 4). It is obvious that in the resulting x-ray the contact points will not overlap.

Taking Satisfactory Diagnostic Bitewings

All of the foregoing descriptions must be coordinated in order to take satisfactory diagnostic bitewings.

Technique—1. Instruct the patient to sit upright in the chair.

2. Be sure that an imaginary line connecting the ala of the nose and the tragus of the ear is parallel to the floor.

3. Bring the tube into correct basic relationship (Fig. 1). The tube must be parallel to the proximal surfaces of the teeth.

4. Look into the mouth. *Do not* put the film into the mouth at this point. Observe the occlusal contact line of the first and second molars.

5. Direct the cone so that the central ray follows this line.

6. Now place the film in the lower jaw and have the patient bite on the wing.

7. Bring the cone in contact with the face, making sure that the central ray is (1) pointed at a right angle to the film, and (2) is passing mesio-

8. ***Type 4. Use two films. One film for the mesiodistal horizontal correction and one film for the distomesial horizontal correction of the vertical projection.***

distally along the buccolingual occlusal contact line of the first and second molars (Fig. 4).

A Correlation of the Vertical and Horizontal Angles—The vertical angle is directed at a right angle to the film (Fig. 4A) but it has been corrected by the horizontal angle so that while it is still a right angle, it is a right angle that is directed mesiodistally along the buccolingual occlusal contact line to correct the overlapping of the contact points.

The Vertical Right Angle—Had the vertical right angle (Fig. 3) been used, overlapping would have been inevitable. Figure 4 shows how the vertical angle was corrected by the horizontal angle, thereby eliminating overlapping of contact points. This technique is used to correct overlapping in any part of the dental arch.

Types of Overlapping—There are four main types of overlapping of the teeth:

Figure 5, type one. Here there is no overlapping. A straight right angle is all that is necessary.

Figure 6, type two. This type calls for a distomesial horizontal correction of the vertical to eliminate overlapping.

Figure 7, type three. This type calls for a mesiodistal horizontal correction of the vertical to eliminate overlapping.

Figure 8, type four.This is a double overlapping. In order to portray this region correctly it would be necessary to take two pictures: (A) One for the mesiodistal horizontal correction and (B) one for the distomesial horizontal correction. In this way the first and second molar contact points would be cleared. This situation often occurs in the bicuspid region and should be handled in the same manner.

Additional Film Required

The technique described takes extra films but they are necessary for successful diagnostic results. There always have been too few films used in bitewing technique. The usual procedure is to try to get all of the bicuspids and molars on one Number 3 film. It is not possible to do that diagnostically.

9. ***X-rays showing overlapping contact points. No disease visible.***

10. ***Horizontal correction of Figure 9. The lesion is now visible.***

Method—It is far better to use two Number 2 films: (A) One for the bicuspid-first molar region, and (B) one for the molar region. The following steps should be taken: 1. The first bitewing film should be placed well forward so that the anterior edge is behind the cuspid.

2. Push the film away from the teeth so that it will slide easily and comfortably into place. It is not necessary to have the film touch the teeth.

3. Place the second film back far enough so that the posterior edge is beyond the third molar.

A Third Film—In applying the technique outlined sometimes the upper molars will be correctly portrayed but there will be some overlapping in the lower molar region. To correct the overlapping, a film will have to be taken for the lower molars. This seldom happens but when it does, it must be corrected.

Examples—Figures 9 and 10 show the results obtainable with the technique described. Figure 9 is a typical picture of overlapping contact points. (1) The distal surface of the first molar and (2) the mesial surface of the second molar can be clearly seen. Note that *there is no break* in either of these surfaces which leads to the assumption that there are no cavities present. Many films of this kind have been passed over as negative.

An Important Fundamental—An x-ray showing overlapping contact points *cannot be trusted.* The reason for this is illustrated in Figure 10. Using the technique described, the contact points were separated, clearly revealing a cavity on the distal surface of the first molar and a periodontal pocket between the first and second molars.

Conclusions

1. A little extra effort and a little extra thought will produce successful diagnostic x-rays.

2. Do not carelessly place a film in the mouth and "shoot" the picture. Thorough and painstaking preparations should be made before proceeding.

3. Examine the buccolingual occlusal contact lines before attempting to determine the angle to be used.

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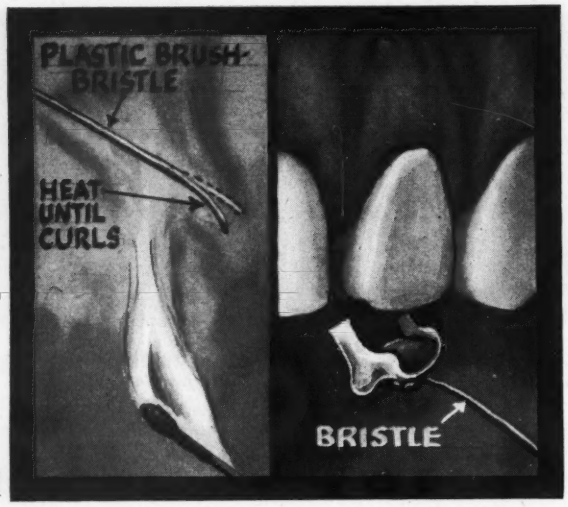


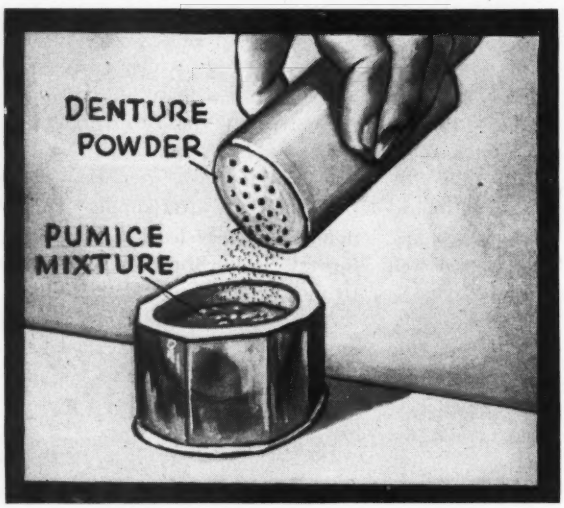
1

Clinical and Laborato

A Plastic Sprue Pin

Edward J. Berens, D.D.S., Hammond, Indiana

1. A bristle taken from a plastic clothes brush makes an ideal sprue for use in removing wax patterns from a preparation. Heat a plastic bristle over the flame of a match. As soon as the plastic begins to curl, insert it in the wax pattern and allow to cool. Invest. The plastic sprue pin burns out with the wax.



2

A Spatterless Prophylactic Powder

H. S. Susman, D.D.S., Omaha, Nebraska

2. The pumice-water-toothpowder mixture used for prophylaxis will not spatter over the patient's face and clothes if a little denture adhesive powder is added as a binder.

3

A Plaster Gun

L. C. Holtzendorff, D.D.S., Valdosta, Georgia

3. The large end of a funnel is trimmed with shears until it fits snugly halfway down into a one-piece, 5-ounce paper cup. Do not use a two-piece cup. Plaster is mixed in the paper cup. The funnel is placed in the plaster until it fits snugly to the walls of the cup. The appliance is carried to the mouth and thumb or palm pressure is used to force the plaster through the small end of the funnel.

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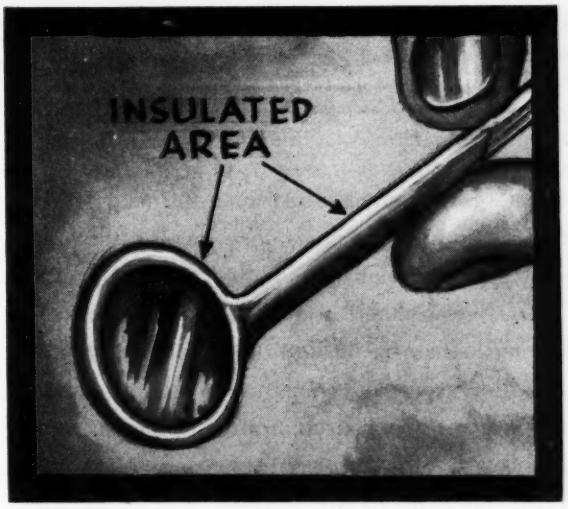
SUGGESTIONS . . .

An Insulated Mouth Mirror

Fred D. Miller, D.D.S., Altoona, Pa.

4. To create an insulated mouth mirror for use in electrosurgery, cover the metal back of the mirror and the shank with one of the self-curing acrylics.

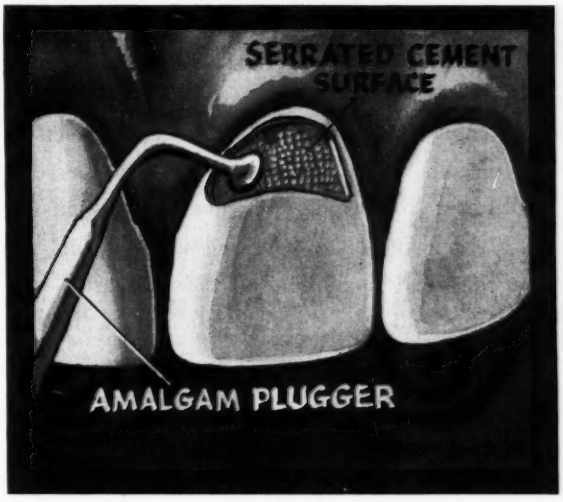


4

Additional Retention in Class V Cavities

Morton H. Zisk, D.D.S., Hackensack, N.J.

5. In Class V cavities, before the cement base has completely set, tamp the entire surface with a serrated amalgam plugger. The serrated surface will produce additional retention for the restorative material.

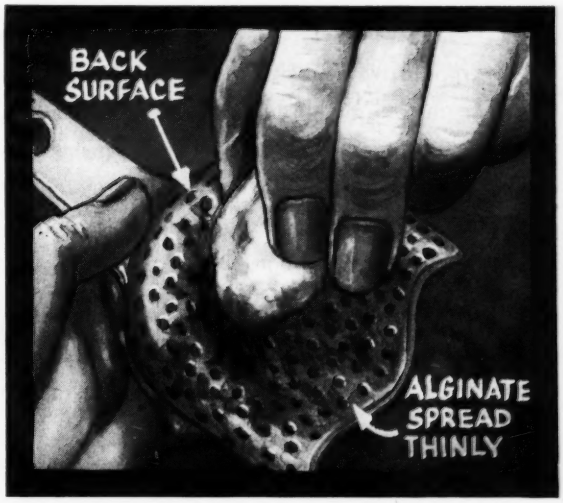


5

Retention of Alginates in the Impression Tray

Irvin Vine, D.D.S., Yardville, N.J.

6. To ensure better retention of alginates within an over-sized perforated tray, a thin amount of the alginate is spread over the entire *back* surface of the tray, thereby creating a solid union of the impression material to the tray. This reduces the possibility of distortion of the impression.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time.

Turn to page 274 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

The EDITOR'S Page

DENTISTS ARE often called upon to make differential diagnoses for pains that involve the upper posterior teeth and the maxillary sinus. During an acute sinusitis there is frequently a tenderness of the teeth that are in approximation to the sinus. Maxillary sinus infections are acute and chronic; suppurative and nonsuppurative. Acute infections are usually of nasal origin whereas some forms of infectious sinusitis are secondary to dental infections.

In an excellent review of the subject Gill-Carey[1] makes these distinctions:

"Suppurative sinusitis is a disease primarily nasal, with or without secondary infective effects on other organs, and accounts for about 30 per cent of all cases. Nonsuppurative sinusitis is responsible for 70 per cent of the cases and seems to fall into three groups: the allergic, the endocrine disturbances, and the dietary deficiencies, in that order of diminishing frequency.

"Accuracy in diagnosis of the type of sinusitis in question is the keystone of successful treatment. This point cannot be over-stressed. Until recent times all cases of sinusitis were treated as for infection. The end-results, in cases of nonsuppurative sinusitis, have been poor."

Nonsuppurative sinusitis has this clinical picture: The mucous membrane is pale and edematous, the secretion is colorless and sticky. Sneezing is pronounced. Headache is common. Correlated allergic conditions, such as asthma and gastrointestinal symptoms, are common.

In suppurative sinusitis there is usually an association with an acute upper respiratory infection although 15 to 20 per cent of cases in this group (6 per cent of *all* cases of sinusitis) may be of dental origin. Despite the mechanism of origin, the secondary dental symptoms of pain in the upper posterior teeth may be frequent. Wherever and by what method the sinus membranes are involved, there may be dental symptoms because of the frequent association of the roots of the posterior teeth with the tissues of the maxillary sinus. In suppurative sinusitis there is hyperemia with purulent or mucopurulent discharge. Headache is rare, although the general toxic reaction with depression may be severe.

The dentist will be more concerned with the sinusitis of infectious origin. In the acute stage the aim, according to Gill-Carey, "is to preserve the mucociliary barrier to aid drainage from the sinus, to relieve pain, and to diminish the virulence of the invading organisms." In the early acute stage local surgical trauma should be avoided and the antibiotics should be used energetically. Subacute sinusitis requires irrigation.

In chronic suppurative sinusitis "the antibiotics and sulphonamides are rarely necessary or useful . . . There is little advantage in incorporating either of the above drugs in irrigating fluids."

During surgical procedures on the upper posterior teeth a root fragment is occasionally forced into the maxillary sinus. According to competent oral surgeons, the treatment of choice is to make an *immediate* and *complete* closure of the opening that leads from the mouth into the sinus. The root should subsequently be recovered through a surgical opening in the canine fossa. Although the natural tendency is to recover the root by instrumentation or irrigation through the tooth socket, this method is hazardous because of the danger of infecting the sinus membrane and producing an infectious sinusitis.

[1]Gill-Carey, C.: Acute and Chronic Sinusitis, British Medical Journal (February 18) 1950.

MEDICINE and the Biologic Sciences

Mechanical Backache

One of the most common complaints presented to the general practitioner is pain in the lower part of the back. It is so common that its importance is minimized. Many persons believe the condition is associated with arthritis. As a result they believe that little can be done for it.

The complaint is especially pertinent to the dental profession. Dentists are subjected to many of the mechanical factors predisposing to such a backache. Good body balance is necessary to maintain the erect position. The following mechanical factors prevent the maintenance of proper body balance: (1) faulty posture, (2) obesity, (3) relaxed abdominal musculature, (4) weak back musculature, (5) inequality of length of the lower extremities.

The same mechanical factors often play a significant role in producing at least a portion of the low back pain associated with fibrositis, hypertrophic arthritis, rheumatoid spondylitis, spondylolisthesis, and other causes of backache. The term "mechanical backache" is associated with the case in which there is nothing demonstrable that would account for the pain within the back or the pelvis other than mechanical factors.

Good posture is essential to good body balance. When one stands with good posture, a perpendicular line dropped from the ear passes through shoulder, hip, and ankle joints. With good posture, the head is high, the chin up and in, the chest up, the shoulders relaxed and back, the abdomen flat, the lower part of the back flattened, the knees straight, and the feet parallel. Little muscle energy is required to maintain the erect posture because the body is so correctly balanced.

A sagging abdomen, a flattened chest, humped shoulders, and a swayed back can easily upset the normal body balance. With poor posture, unnatural stresses and strains are thrown on muscles and ligaments which support the vertebral column. These stresses and strains become most pronounced at the lumbosacral joint.

Women are more apt to have a "mechanical backache" than men. This is due to the prevalence among women of obesity, poor posture, and weak back and abdominal musculature.

The usual history is one of gradual onset of low back pain. The pain is usually localized to the lumbosacral region. It does not radiate into the lower extremities. The back pain is usually of many years duration. The patient is seldom incapacitated as the pain is not often severe.

The pain is usually relieved by rest and by application of heat on the area. It is usually aggravated by fatigue, by long periods of standing or sitting and by bending, stooping, or lifting. Changes in the weather have no effect on it. Coughing, sneezing, and straining do not intensify it.

Sleeping on a hard bed is advisable. Heat aids in the relaxation of the back muscles and stimulates circulation. Exercises to improve the posture should be recommended.

A corset or back brace of any type should be considered only a temporary relief measure. As a rule, a brace should be recommended only if the patient is quite obese and the abdominal musculature especially relaxed. The brace should be discarded when the back becomes strong enough to get along without it. Back muscles are strengthened only by exercise and not by the wearing of a support.

Phalen, George S.: The Diagnosis and Treatment of "Mechanical Backache", J.A.M.A. **141**:445-448 (*October* 15) 1949.

The Value of Garlic

As a carminative, garlic causes (1) a sensation of warmth on passing into the stomach, (2) a sense of well-being and comfort, and (3) relieves any feeling of distension after meals. Often this is attended by eructation of quantities of gas.

More recently it has been noted that dehydrated garlic tablets produce therapeutic results with complete symptomatic relief. Garlic in this form is highly effective for the relief of heaviness after eating (both epigastric and abdominal distress.) It also relieves belching, flatulence, gas colic, and nausea.

Satisfactory results are obtained in the following cases: (1) Flatulent dyspepsia, (2) nervous dyspepsia, and (3) other gastric neuroses. Dehydrated garlic has a sedative action on the stomach and intestines. It relaxes spasm, retards hyperperistalsis, and disperses accumulations of gases. It is believed that the carminative action of garlic is due to unidentified principles in the garlic.

Dehydrated garlic tablets are safe for long-continued use and may be prescribed for a wide variety of functional disturbances of the stomach and intestines.

Damran, F., and Ferguson, E. A.: Modus Operandi of Carminatives: Therapeutic Value of Garlic in Functional Gastrointestinal Disorders, Rev. Gastroenterol. **16**:411-416 (*May*) 1949.

Rheumatic Fever—Etiology

Susceptibility to rheumatic fever is a hereditary factor. However, the same pathologic process seems to take place to a limited extent in many normal persons.

The frequency with which susceptible persons contract rheumatic fever is influenced by internal and external factors. Internal factors are the following: (1) Sex, (2) age, (3) pregnancy, (4) diabetes, and (5) thyroid disease. External factors include climate and diet.

Pathologic similarities and overlapping hereditary factors and incidence suggest similar defects in rheumatic fever, rheumatoid arthritis, periarteritis nodosa, and glomerulonephritis. Rheumatic patients show a decided nonspecific hyperirritability to most stimuli.

Attacks of rheumatic fever are usually precipitated by streptococcic infections of the throat. Trauma, cold, and fatigue may also initiate attacks. The process set in motion by these various events is not understood. The clinical pattern of rheumatic fever may depend on such factors as trauma, environment, previous history, and conceivably, nervous reflex patterns.

Waksman, B. H.: Etiology of Rheumatic Fever: Review of Theories and Evidence, Medicine **28**:143-147 (*May*) 1949.

Swimming vs. Sinusitis

Several efforts have been made to determine the possible relationship of swimming and diving to sinusitis and hearing loss. There is a wide difference of opinion with regard to this relationship.

The difference of opinion is based to some extent on the degree of lesions as determined by investigators with various types of training.

In one large experimental group of almost 1,000 college graduates half of whom were trained swimmers, four sets of investigators gave different opinions: 1. Coaches and swimming instructors noticed little infection. 2. School and college physicians reported more infection. 3. The otolaryngologists recorded still more. 4. The pediatricians noted the most infection.

The degree of sinusitis and hearing loss was no greater among trained swimmers than among unselected college graduates. There seems to be less severe upper respiratory infection among the swimmers and divers than among the controls. Salt water swimming is considered safer than fresh water swimming.

Important factors in the control of sinusitis and hearing loss in relation to swimming and diving are the following: (1) proper training and supervision, (2) maturity, (3) lack of respiratory infections, and (4) uncontaminated water.

Hitschler, H. J.: Relationship of Swimming and Diving to Sinusitis and Hearing Loss, Laryngoscope **59**: 799-802 (*July*) 1949.

The Guterman Test for Pregnancy

Because of its rapidity and the fact that it does not involve the use of animals, the Guterman test for pregnancy has certain advantages over many of the more commonly used biologic procedures for pregnancy diagnosis.

This comparatively simple test depends on the color developed when pregnanediol extracted from the urine of pregnant women is treated with sulphuric acid. Pregnanediol in the urine is hydrolysed by acid in the presence of toluene to give an extract of free pregnanediol. When free pregnanediol is treated with concentrated sulphuric acid an orange-yellow color is produced. The appearance of this color indicates a positive result.

In actual testing, the color ranges from pale straw to brownish-orange. It requires considerable experience in reading the tests to differentiate the paler colors.

Generally the Guterman test is considered to be only 57 per cent accurate. It suggests a positive result in a large per cent of cases that are pregnant. It is a definite aid and serves to alert the practitioner as well as to verify to some extent other findings.

The earliest at which a correct positive test is obtained is eight days from the end of the last menstrual period. The test is seldom more than 65 per cent accurate in the first four months of pregnancy when it is likely to be of most use. After the fourth month the degree of accuracy is extremely high.

The test is of some value in women who threaten abortion. Some women give a positive reaction early in the pregnancy only to give a negative reaction later. Records show that many of these abort. Therefore, the test helps to alert the practitioner to a possible interruption of the normal pregnancy.

In general, it seems that if positive results or tests which become positive when repeated are obtained from patients with threatened abortion the likelihood is that they will retain the pregnancy.

Merrivale, W. H. H.: The Guterman Test for Pregnancy, Brit. M. J. **1**:685-690 (*April* 10) 1948.

ACTH

One of medicine's most potent as well as most dangerous drugs is receiving considerable attention in current literature. This is ACTH, the new pituitary hormone. Its principal benefit is in producing a definite improvement in rheumatic fever in practically all of its manifestations.

ACTH is made from the pituitary gland found in the head of hogs. Its function in the body is to stimulate the outer layer of the adrenal glands lying over each kidney. Its effect in the body is to stimulate the production of more than twenty-eight hormones by the adrenals. One of these adrenal hormones is cortisone, which also controls arthritis and gout.

Armour and Company recently brought together representatives of 45 clinics now investigating the possible uses of ACTH. The data presented at this two-day conference in Chicago probably represents the latest authentic information on the status of the drug.

ACTH has been definitely established as having great value in rheumatoid arthritis, gout, and several other conditions. The supply is limited severely by the number of hogs slaughtered and by the small amounts of drug obtained from each hog. There is scarcely enough available to do the research that is essential to its development. At the same time, it has been recognized as a dangerous drug which might cause death if improperly used. So far it is not legal to distribute it except for research.

The drug is in the very early stage of investigation. Even now it has been found to make many disease conditions worse rather than better. Some cases of high blood pressure and some forms of cancer are in this group.

The results to date on the work dealing with rheumatic fever are extremely optimistic. The following manifestations of the disease have been helped: (1) heart valve damage, (2) congestive heart failure, (3) joint swellings, (4) skin nodules, (5) inflammation of the lining and outer cover of the heart, and (6) extremely rapid heart beat.

Probably 60 to 70 per cent of all victims of rheumatic fever suffer heart damage. Most of them manage to survive and establish some level of existence. However, a peculiarity of the disease is that it strikes repeatedly so that the damage is made continually worse.

The great value of ACTH in rheumatic fever is that it will be able to control recurrences and thus prevent the heart damage from becoming worse. Rheumatic fever response to ACTH is not like that of arthritis. Patients do not need to have ACTH permanently. They are permanently cured.

Outstanding successes have also been reported in the field of allergy. The reaction in asthma, hay fever,

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CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 268 *and* 269)

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Subject: _____

Explanation of Procedure:

Sketch:

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and drug sensitivity treated with ACTH is far more satisfactory than with the antihistaminic drugs. Some intractable cases of asthma far beyond any other drug help, cleared to normal breathing in twelve to thirty-six hours. In hay fever victims eight 25-milligram injections six hours apart cleared the acute conditions and protected the patient against hay fever for the remainder of the hay fever season. Several cases of eczema cleared in two to three days.

The juvenile form of rheumatoid arthritis cleared up rapidly to a point where no further drug was necessary. With adult arthritis benefit was obtained but it was necessary to continue the drug indefinitely.

A number of unfavorable side effects have been reported. It is believed that these effects are due to the unfamiliarity with the proper dosage for each person. Experience will teach medical men how to avert these reactions.

Article: Report ACTH Produces Definite Improvement in Rheumatic Fever, Hosp. Management **68**:80-82 (*November*) 1949.

The Words We Live By

Before we can communicate by any method, we must have a common basis of understanding. Although we may use the same language, English, for instance, that does not mean that two people communicating in English understand each other. The jargon of a trade or a science may not be understood by one outside the specialized group. People who express themselves in high order abstractions are conspicuous subjects for misunderstanding. If you want people to know what you are talking

about, be specific, use concrete words, and stick to simple forms of speech.

As a preliminary to successful communication we must agree on terms and the frames of reference. Even in a professional field we should have a nomenclature that assures us that when dentists talk or write they are making themselves understood and that the speaker and the listener, or the writer or the reader are referring to the same things. The words used to communicate among dentists should be checked frequently and changes in usage and meaning should be brought to the attention of the profession. Nowhere in our field has more chaos reigned than in periodontia where diseases of the supporting tissues have carried these labels: pyorrhea, pericementitis, periodontoclasia, paradontosis, periclasia, periodontitis.

To the credit of the American Academy of Periodontology[1] some order has been established in the field of dental linguistics and the committee of nomenclature should be commended for making these suggestions for a meaningful terminology in periodontia:

1. *Alveolar Bone*—The alveolar processes of the maxillae and the mandible. Within the alveolar bone an arbitrary division can be made between the "cribriform plate" and the "alveolar supporting bone." The cribriform plate may be defined as the thin perforated bony plate to which the fibers of the periodontal membrane are attached and through which the vessels and nerves enter and leave the periodontal membrane. In radiography this bony plate is called "lamina dura" as it appears more radiopaque than the surrounding spongy bone, but the term "cribriform plate" is to be preferred. The alveolar bone consists of the compact cribriform plates and of the spongy or trabecular bone of the alveolar processes.

2. *Alveolus, Dental*—The socket in the alveolar process in which the root of the tooth is ordinarily held by the fibers of the periodontal membrane.

3. *Bruxism*—Gnashing or grinding of the teeth in other than normal function. This grinding of the teeth

[1]Report from the 1949 Nomenclature Committee, *The Journal of Periodontology* **21**:40-43 (January) 1950.

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is an unconscious habit and is often limited to the sleeping period, but may occur at times of mental or physical concentration or strain. Bruxism may develop into a neurotic symptom, "bruxomania."

4. *Calculus*—See dental calculus.

5. *Dental Calculus*—(Synonym—tartar) Concretions deposited on the teeth consisting of inorganic salts deposited in an organic matrix. One can classify dental calculus roughly into supragingival calculus, and subgingival calculus.

6. *Epulis*—The term "epulis," denoting a tumor on the gingiva, is a nonspecific term, and should be discontinued. The form is loosely used for tumors of varying cell types.

7. *Gingiva*—That part of the oral mucous membrane that covers the alveolar processes of the jaws and surrounds the necks of the teeth.

8. *Gingival Hyperplasia*—Overgrowth of the gingival tissues. There is some misunderstanding as to the correct use of the terms hyperplasia and hypertrophy. A sharp and definite difference does not always exist. Hyperplasia is defined as an overgrowth of tissue due to an increase in the number of its elements. Hypertrophy, on the other hand, is an increase of an organ due to increase of the size of its elements, and serves a useful purpose. An example of a true hypertrophy is the enlargement of the heart due to overwork, or enlargement of muscles due to increased activity. Each cell becomes longer and thicker. Overgrowth of the gingiva, however, is a hyperplasia (increased number of cells.)

9. *Gingival Pocket*—The gingival pocket may be defined as a pathologically deepened sulcus.

10. *Gingival Recession*—Progressive exposure of the root surface by apical shift of the gingiva, following resorption of the alveolar crest and loss of the corresponding part of the periodontal membrane (see periodontal atrophy).

11. *Gingival Sulcus*—The shallow groove around a tooth, bounded on one side by the surface of the tooth and on the other by the epithelium lining the free margin of the gingiva. This term designates the "normal" condition as distinguished from the gingival and periodontal pocket.

12. *Gingivitis*—Inflammation of the gingiva. The condition may be

further defined and described by such adjectives as acute, chronic, purulent, ulcerative, hyperplastic, scorbutic, etc.

13. *Intrabony Pocket*—This term is used to describe a pathologic pocket whose base is markedly apical to the alveolar bone crest for the adjoining tooth. The term is not a good one because it implies that the pocket is "within" the bone. While all members of the Committee agreed that the term was misleading, no acceptable substitute was suggested, although "interbony pocket" (pocket alongside of bone) would be better than the present term. "Intrabony pocket" should be deleted as soon as a more satisfactory one is found.

14. *Oral Mucosa* (*Oral Mucous Membrane*)—This is the lining of the oral cavity. It may be divided into: *masticatory mucosa* — Epithelium hornified, immovably attached; gingiva, hard palate; *lining mucosa*—Epithelium nonhornified: loosely attached, firmly attached; *specialized mucosa*: Back of tongue.

15. *Periodontal Abscess*—Acute or subacute purulent exacerbation of a chronic periodontitis, associated with deep periodontal or gingival pockets.

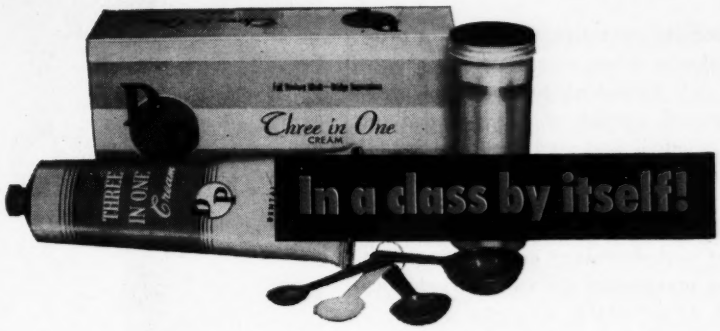
16. *Periodontal Atrophy*—Progressive resorption of alveolar crest with loss of the corresponding part of the periodontal membrane, recession of gingiva, and exposure of root surface.

17. *Periodontal Diseases*—Collective term designating any disease process which involves the periodontium.

18. *Periodontal Membrane* — The fibrous tissue that connects the cementum of the tooth to the surrounding structures.

19. *Periodontal Pocket*—A periodontal pocket may be defined as a gingival sulcus pathologically deepened by periodontal disease. It is bordered on one side by the tooth and on the other by the gingival tissues. Its base is limited by the epithelial attachment, which is usually not intact in this area. The chief features of the periodontal pocket are the ulceration of the epithelium lining the pocket and the inflammation of the gingival corium. The "pocket" is usually filled with debris and calculus.

20. *Periodontal Traumatism*—Injury of periodontium due to excessive



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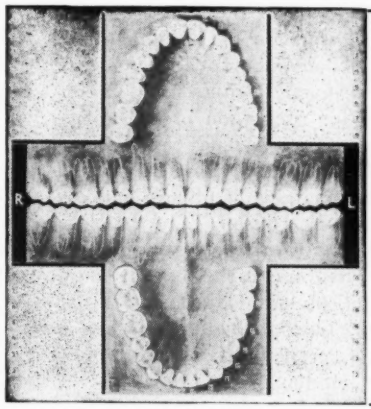

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occlusal operative, accidental or orthodontic stress (see traumatism).

21. *Periodontist*—One who has acquired considerable knowledge of periodontology and is skilled in the treatment of periodontal diseases.

22. *Periodontia*—The branch of dentistry that deals with the science of periodontology and the treatment of periodontal diseases. Periodontics is an acceptable synonym.

23. *Periodontitis* — Inflammatory involvement of the periodontium. *Periodontitis simplex* — sequela of gingivitis. *Periodontitis complex* — periodontitis secondary to periodontosis. The condition may be further defined and described by such adjectives as acute, chronic, ulcerative, purulent (suppurative), etc.

24. *Periodontium*—The investing and supporting tissues of the tooth; namely, the periodontal membrane, the gingiva, cementum, and the alveolar bone. Although the cementum is part of the tooth, it is one of the supporting tissues because it holds one end of the periodontal membrane.

25. *Periodontology*—The science and study of the periodontium and periodontal diseases.

26. *Periodontosis*—A general term to include a degenerative noninflammatory destruction of the periodontium originating in one or more of the periodontal structures, characterized by migration and loosening of the teeth in the presence or absence of secondary epithelial proliferation and pocket formation or secondary gingival disease. It is possible to subdivide cases of periodontosis into several subdivisions.

27. *Pocket*—See gingival pocket, periodontal pocket, intrabony pocket.

28. *Sulcular* (*Sulcate*) *Epithelium*—The thin epithelial lining of a gingival sulcus.

29. *Traumatism*—Morbid condition of tissue caused by mechanical trauma (pressure necrosis and its consequences: thrombosis, hemorrhage, resorption of bone and cementum).

30. *Vincent's Infection*—It is recommended that this designation of a certain type of gingival inflammation be discarded. Properly one should speak of an "acute, subacute, or chronic necrotizing gingivitis." The term "Vincent's angina" should be discarded.

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The following terms are suggested as a glossary for the techniques used in periodontal therapy:

Periodontal Prophylaxis: Technique for prevention of periodontal disease, which includes cleansing and polishing of teeth, elimination of irritating margins of fillings, and correction of occlusion.

Subgingival curettage, gingivectomy, flap operation, occlusal equilibration, occlusal adjustment or correction, functional adjustment or correction, prophylactic scaler, prophylactic curette.

Now that this fine beginning has been made in one specialty, it would be desirable if other specialty boards and groups set up similar standards in terminology. The study of semantics impresses on us that the *word* is not the *thing*. That is true. But if the word we use stimulates thought and association processes, and identification, it is important that we are referring to the same kind of thing when we communicate. For example, when a speaker or a writer refers to a "pocket" it is important that the listener or the reader has the same

conception of a "pocket" in mind. If not, communication failure results and this kind of failure leads to misunderstanding and unproductive argument. Too often I have heard dentists arguing with each other about something that carried an indistinct "label." They *thought* that they were talking about the same thing, or they *were* talking about the same thing, but were giving it a different name. Before we discuss anything, we should certainly know what we are talking about ourself and we should be sure that the person we are talking with knows in general, at least, what we are talking about. One way to be sure of understanding is to define the frames of reference and the areas of discussion before we become confused and irritated with each other.—E. J. R.

Malignancies of the Oral Region[1]

THE STRUCTURES of the oral cavity may be involved by malignant primary or secondary tumors arising from either ectodermal or mesenchymal elements. Such tumors exhibit the clinical characteristics of invasion, destruction of contiguous tissue, and metastasis. When incipient, their detection is of the utmost importance; and, when of long standing, correct diagnosis is essential in order to determine their prognosis. For many years it was common practice to divorce the dentist from any responsibility for the detection and treatment of malignant tumors. Now, however, it is realized that such disturbances are not only topographically, but therapeutically, a dental problem.

Basal cell carcinoma is rare intraorally, occurring more commonly in the upper portion of the face. It arises from the basal layer of the epidermis or from the epithelium of the skin appendages and retains its basal characteristics to a marked degree. Although it seldom metastasizes, it erodes contiguous tissue. It may be divided into two broad groups—the Krompecher and the Brooke. The Krompecher type is characterized histologically by large, relatively solid collections of cells that arise from the basal layer of the epidermis and spread in all directions, producing superficial ulceration and relentlessly invading adjacent tissues. Basal cell tumors of the Brooke type are usually small and elevated and frequently multiple. They arise most commonly from the epithelium of follicles of either long or lanugo hair. The cells appear in round or oval islands in the corium and do not show the same tendency to invade as those of the Krompecher type. In general, the basal cell carcinoma responds well to irradiation, those occurring in the mucous membrane being somewhat more resistant.

Squamous cell carcinoma is of particular interest to the dentist because of the frequency with which it occurs on the lips and within the oral cavity. Most workers recognize two types of lip lesions—the papillary, and the ulcerating or infiltrating. There are many transition forms between these

[1]Abstract of a paper entitled "Differential Diagnosis of Oral Lesions," by Lieutenant Colonel Joseph L. Bernier, D.C., submitted through the Office of the Surgeon General for publication in *Oral Surgery, Oral Medicine and Oral Pathology*, Vol. 2, May 1949, pp. 617-627, and June 1949, pp. 690-703.

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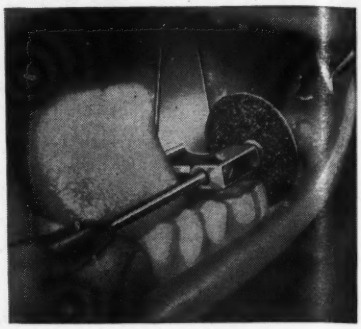
two extremes. The papillary or verrucous form, in its early stages, appears as thickening of the epithelium with a slight elevation above the surrounding skin. Many of these lesions remain superficially located, spreading laterally. As a rule, ulceration occurs terminally first at the center, later spreading to the periphery. These lesions occur predominantly on the exposed mucous membrane surface of the lip. This tumor occurs most frequently in persons between the ages of 50 and 60, but recent analysis of over 800 cases in the Army Institute of Pathology files indicates that it occurs much more frequently in younger persons than heretofore believed. The lesion occurs about fourteen times as often in men as in women, and in both sexes predominantly on the lower lip. The lesion grows rapidly, usually existing for only a few months until it is recognizable clinically. Its size varies considerably, but it seldom exceeds 1.5 centimeters in diameter.

Squamous cell carcinomas occur frequently within the oral cavity, those on the cheeks and in the vestibule apparently often resulting from irritation. Tumors in these locations may follow long-standing leukoplakic lesions, under which conditions ulceration appears only terminally.

Carcinoma of the tongue is usually more malignant than that of either the lips or the cheeks, and, when the tumor is near the posterior portion of the tongue or in the floor of the mouth, the patient seldom survives more than two years. Tumors in this location are more common in men than in women. Early in its course the patient experiences difficulty in eating and speaking because of pressure on both motor and sensory nerves. As a result, pain occurs early and is often very severe. It is referred to the ear, and is exaggerated by swallowing. The regional lymph nodes are involved earlier than in carcinoma of the lip. One must always examine such enlargement of the regional lymph nodes carefully, however, because it may be caused by inflammation.

The buccal and lingual gums are not as frequently the sites of the



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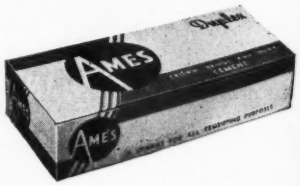

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squamous cell carcinoma as the mucosa in other areas of the mouth. The tumors that do occur may result from local irritation, and the prognosis is serious because of the likelihood of extension to the body of the mandible. Carcinoma on the buccal mucosa is usually preceded by a long-standing leukoplakia that has become resistant to treatment. Again, metastasis may be early and extension very wide. The tumor ulcerates early, and the expanding rim is raised and indurated by the younger subepithelial tumor nodules. Necrosis causes a foul odor, and vessels may be eroded, producing hemorrhage. Teeth in the path of the spreading lesion may become loosened and exfoliated.

Squamous cell carcinoma may affect both the hard and the soft palates. The tumor is nodular with irregularly raised indurated margins that soon perforate the palatal bones to involve the nasal chamber and the accessory sinuses. Tumors in this location may exhibit a high degree of malignancy and metastasize early. They must be differentiated from the mixed tumor that may also be invasive.

Primary carcinoma affecting the bone substance of the maxilla and mandible has occasionally been reported. More often, however, carcinoma of the bone is the result of invasion from the mucosa. Central carcinoma expands the bone as it grows, and is usually not discovered until damage is extensive. It may cause teeth in the area to become loosened and even to extrude from their sockets. For this reason the extraction of loose teeth should always be followed by careful examination of the adjacent structures. The typical epithelial pearl of cancer seen in microscopic sections in the less malignant forms is of great diagnostic significance.

Adenocarcinoma should be carefully separated from squamous cell carcinoma and the variant forms of mixed tumor. It is uncommon within the oral cavity as a primary lesion, but when present it occurs as a sessile, lobulated growth, arising from the inferior or superior labial glands and from the lingual glands. Although it has often been reported on the palate, I have found that many of these are really adenomatoid or basaloid forms of mixed tumor. More commonly the tumor is noted in the salivary glands, particularly the parotid. It is composed of epithelial cells that give the general impression of acinar configuration. The cells tend to be columnar in shape, even though many bizarre forms appear. The nuclei are large and rounded, containing much chromatin, which is dispersed throughout the nucleus. In some instances the epithelial cells lose their polarity and produce follicles surrounded by a dense fibrous connective tissue stroma. Cysts of varying size may be produced by obstruction of gland ducts. Adenocarcinoma is less amenable to irradiation than the squamous cell tumors.

Transitional cell carcinoma or lymphoepithelioma is found in the nasopharynx and thus may not seem to be within the province of the dental surgeon; but, since it may invade the paranasal sinuses and especially the

(*Continued on page* 284)

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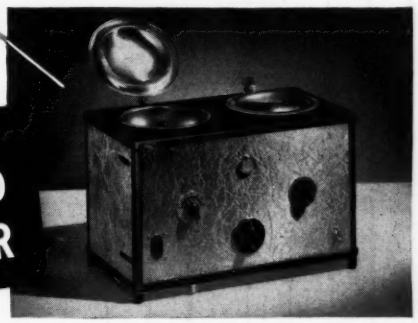

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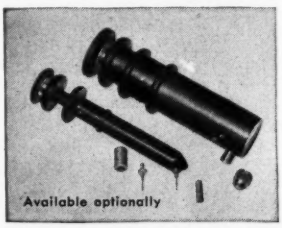

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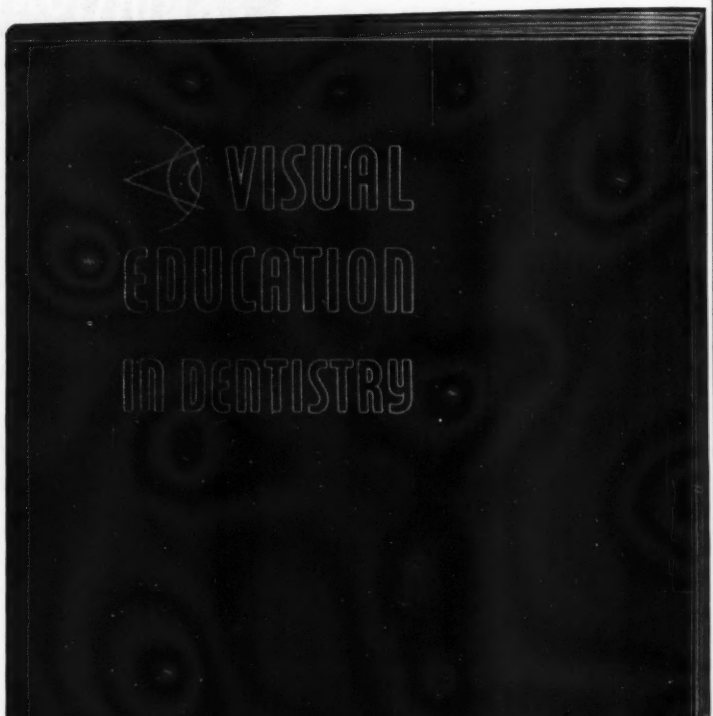
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(*Continued from* 281)

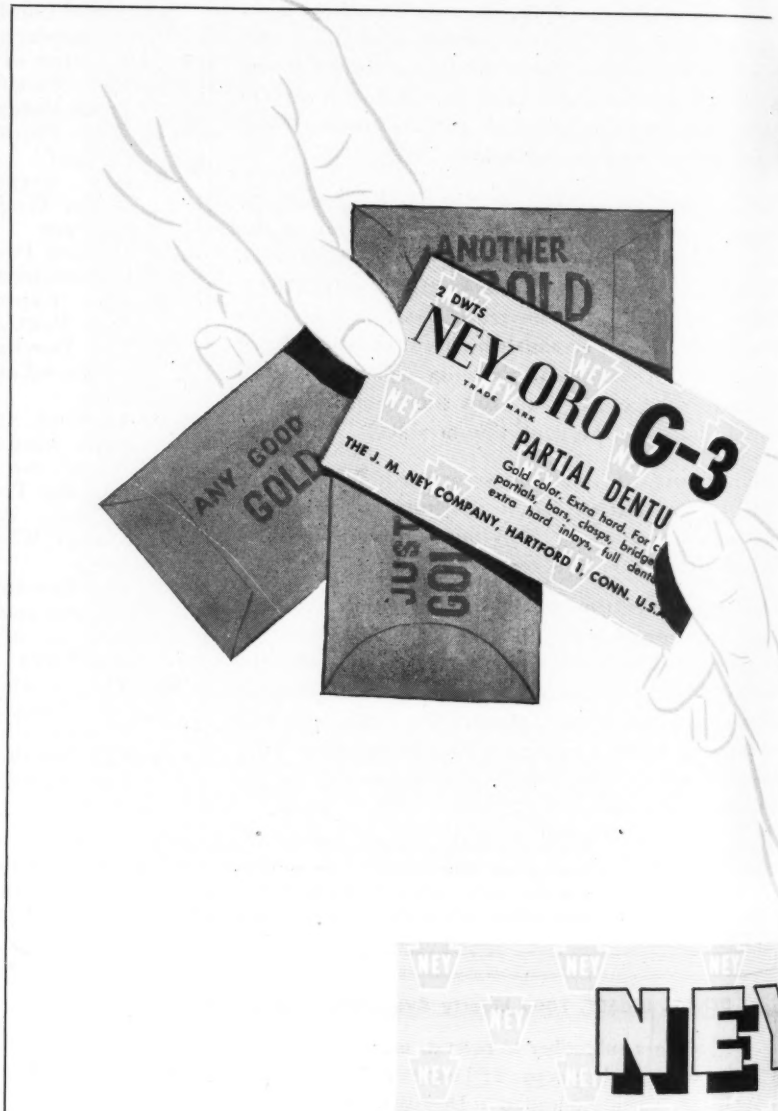
maxillary antrum, the dentist must know something about its clinical features and potentialities. The tumor, particularly common in Mongolians, is about four times more prevalent in males and is not uncommon in young persons. It is important clinically, because it often arises deep in the tonsil or in some inaccessible corner of the nasopharynx where it may be overlooked. It may occur on the palate or in the maxillary sinus, whence it may erode into the oral cavity. As a rule it metastasizes early to the cervical lymph nodes. A tumor arising in the tonsil may be a polypoid mass with a verruciform surface extending into the nasopharynx, even to the point of partially occluding the pharynx. On the palate the lesion often assumes a papillomatous character and is more frequently attached by a broad pedicle.

Histologically the cells tend to retain their germinal character, but may show a tendency to epithelioid differentiation. This is particularly true of those arising in the maxillary sinus. The differentiation of lymphoepithelioma from anaplastic forms of epidermoid tumors and from reticulum cell sarcoma is often difficult. The high degree of radiosensitivity of the lymphoepithelioma is an important point in the differentiation, and the amount of reticulin and its relation to the tumor cells is usually of help. In the lymphoepithelioma, the reticulin is generally in coarse fibers associated with the stroma and blood vessels. In reticulum cell sarcoma, on the other hand, it is in fine fibrils intimately associated with the tumor cells.

Fibrosarcoma is rare in the mouth. When it occurs, it is usually associated with the periosteum or periodontal membrane, occurring on the buccal mucosa or the palate as a nodular tumor covered by normal mucosa. Tumors associated with the periodontal membrane usually spring from its cervical portion and develop rapidly. They seldom contain osteoblastic elements so that they do not produce bone directly, although they stimulate osteoblastic activity in the adjacent bone. Sarcoma of the maxilla invades the maxillary sinus and may extend into the other sinuses, the nasal cavities, and the orbit. The prognosis is unfavorable if the tumor has invaded bone, because removal is difficult and metastases usually occur early.

Chondrosarcoma. Although malignant tumors of cartilage are often grouped with osteogenic sarcomas, it seems expedient to consider them as a separate entity. Those that exhibit an appreciable degree of myxomatous degeneration are referred to as chondromyxosarcoma. They are lobulated, firm tumors that may grow on the surface of bone, seldom penetrating its deeper structures. Areas of ossification are occasionally noted in either the primary tumor or in its metastasis. It is more common in men than in women and may occur at any age.

Osteogenic sarcoma exhibits a wide variety of histologic pictures, from richly cellular fibrous tissue through varying degrees of diffentiation to cartilage and bone. While formerly



there was an attempt to divide this type into several categories, the tendency now is to call them all osteogenic sarcoma. This tumor is not particularly common in the maxilla and mandible. Osteogenic sarcoma is more frequent in children than in adults and is usually solitary in contrast to myeloma, which is usually multicentric and more frequent in adults. Pain may result from the infringement of the tumor on adjacent structures. Teeth in the area may become painful, and paresthesia and a sensation of pressure may result from involvement of the facial nerve. Microscopically the picture is one of progressive activity of the spindle-shaped fibroblast through the osteoblastic stage to the formation of adult bone. Thus, in different portions of the tumor, one is likely to see a preponderance of proliferating fibroblasts, collections of osteoid material, cartilage, or bone. It may be simulated, however, in other conditions, such as myositis ossificans, a benign process. The reaction of the bone to the growing tumor varies to such an extent that at times the roentgenogram may be very deceiving, simulating, for example, healing osteomyelitis. The osteoblastic form presents a somewhat more consistent x-ray picture, in that the new periosteal bone is plainly visible and the medullary portion exhibits sclerosis.

Rhabdomyosarcoma is a malignant tumor of striated muscle. It is usually seen in the tongue and palate, but has been reported in other oral structures. It is not always easy to separate the benign from the malignant tumors of skeletal muscle, in that variation in cell structure is a characteristic of both forms. It is radioresistant, invasive, and exhibits a marked tendency to recur after surgical removal, but does not metastasize as readily as the usual malignant tumor. The striking feature about tumors of striated muscle is the great irregularity in size and shape of the cells. Although giant and bizarre forms are present in other tumors—for example, melanomas—such cells do not have the ribbonlike cytoplasmic processes that one sees in the rhabdomyomas. An absolute diagnosis rests on the finding of cross striations in the neoplastic cells.

Reticulum cell sarcoma arises from the cells of the reticuloendothelial system, especially those of the lymph nodes, spleen, and bone marrow. It is generally classed with the lymphosarcomas, although it is possible to recognize this tumor as a separate entity. It is a tumor of late middle life and is not uncommonly encountered in the mouth, complicated by such simple manifestations as Vincent's infection.

From News and Comments, *Bulletin of U.S. Army Medical Department* **9**:696-700 (August) 1949.

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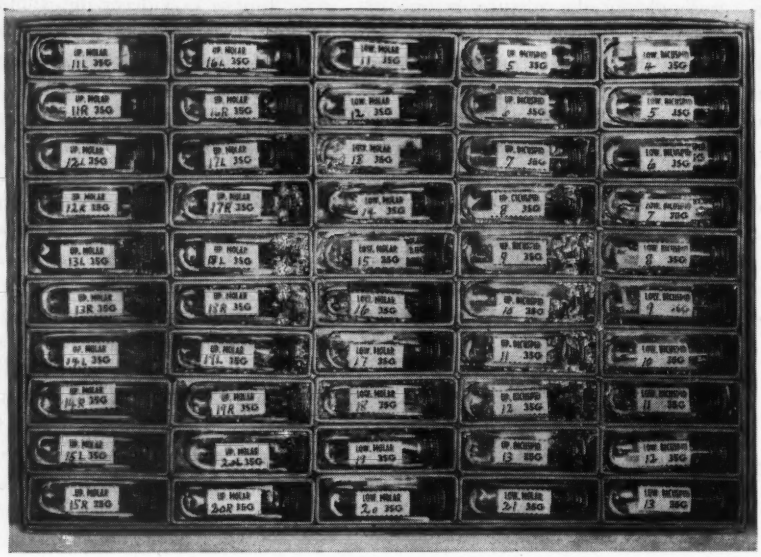

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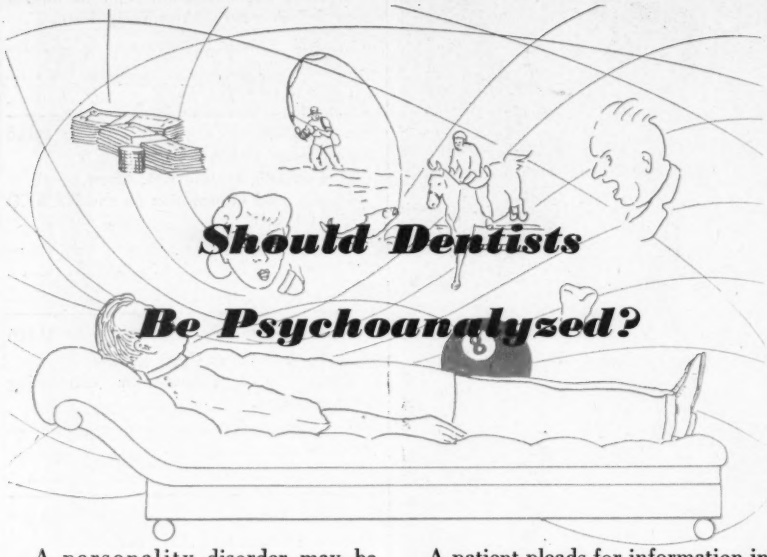

A personality disorder may be much more serious—and painful—than an aching tooth, and receive far less attention. The dentist, so quick to advise his patients to guard their dental health, can be woefully careless about his own mental and emotional well-being. Perhaps he does not like to admit his need for pyschiatric help. It is no more a confession of weakness for a dentist to consult a psychiatrist when mentally or emotionally distressed than it is for the psychiatrist to consult a dentist when his tooth aches.

A successful dental practice depends on successful human relationships—and these, in turn, depend largely on the dentist's own physical, mental, and emotional health. Doctor Joseph Murray writes an interesting and authoritative article stressing the need for psychoanalysis.

★ ★ ★

What are the rights, privileges, and duties of a dentist who takes the witness stand? Even though you never expect to appear in court, you may want to clip and file the informative article, "The Dentist Takes the Witness Stand."

★ ★ ★

Doctor David Tabak's article, "Dentistry's Growing Pains," which appeared in the March issue, has provoked serious discussion. Doctor Joseph R. Valinoti, Jr., replies by letter (see Dear Oral Hygiene) and Doctor Jerome B. Grosby writes an article, "Is Merchandising Dentistry Necessary?" What is your opinion?

A patient pleads for information in the article, "Do Tell Us, Doctor!" It is a sincere request. If you have become tired of repeating the same words over and over, and tend to minimize explanation and instructions, read this article.

★ ★ ★

What's your hobby? Doctor Richard D. Martin's is "being a westerner." He presents real rodeos on his Wyoming ranch and, about three years ago, organized the "Lander Roping and Steer-Wrestling Club." "Dentist, Get a Horse!" is the title of the article.

★ ★ ★

A new organization has been formed to sponsor an annual clinical course in general anesthesia for postgraduates. Doctor S. A. Forman of Cleveland reports on the initial meeting and subsequent activities of the group of 150 dentists who organized the Society of Clinical Dental Anesthesia.

★ ★ ★

"From Dentist to Clergyman" tells the story of Doctor Edwin W. Nies. Deafness, following a childhood attack of spinal meningitis, might seem an insurmountable handicap in pursuing a career, yet Doctor Nies has successfully carried on work in two different fields, dentistry and the church. He was ordained to the priesthood of the Episcopal Church early this year to minister to the Church of St. Ann For the Deaf. His story is an inspiring one.

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